

315

(6) 152

ARCHIVES OF PEDIATRICS

A MONTHLY JOURNAL DEVOTED TO THE
DISEASES OF INFANTS AND CHILDREN

FOUNDED IN 1884 BY WM. PERRY WATSON, M.D.

EDITED BY

LINNÆUS EDFORD LA FÉTRA, A.B., M.D., 1982

MEMBER OF THE AMERICAN PEDIATRIC SOCIETY; INSTRUCTOR IN PEDIATRICS, COLUMBIA
UNIVERSITY; CHIEF OF DEPARTMENT OF DISEASES OF CHILDREN, VANDERBILT CLINIC; ASSISTANT
ATTENDING PHYSICIAN, BABIES' HOSPITAL; ATTENDING
PEDIATRIST, SYDENHAM HOSPITAL, NEW YORK.

AND

ROYAL STORRS HAYNES, Ph.B., M.D.,

ADJUNCT ATTENDING PHYSICIAN, NEW YORK INFANT ASYLUM; ASSISTANT ATTENDING
PHYSICIAN TO THE OUT-PATIENT DEPARTMENT, BABIES' HOSPITAL, NEW YORK.



COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	ES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	W. THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	IRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

VOLUME XXIV

JANUARY TO DECEMBER
1907

E. B. TREAT & CO., PUBLISHERS

241 AND 243 WEST 23D STREET
NEW YORK

325958
7.4.36

LIST OF CONTRIBUTORS.

ABT, I. A.
 ACKER, GEORGE N.
 ADAMS, SAMUEL S.
 AGER, LOUIS C.
 AGOSTINI, V.
 ALLEN, THOMAS GRANT
 BALDAUF, LEON K.
 BARTLEY, E. H.
 BINGHAM, A. W.
 BRAUNLICH, A. R.
 BRENNERMANN, JOSEPH
 CARPENTER, HERBERT B.
 CARPENTER, HOWARD C.
 CHAPIN, HENRY DWIGHT
 CHURCHILL, FRANK S.
 CLOCK, RALPH OAKLEY
 CODMAN, CHARLES A. E.
 DADE, CHARLES T.
 DUNCKEL, W.
 DUNN, CHARLES HUNTER
 EATON, P. J.
 EDWARDS, OGDEN M.
 FAIRBANKS, ARTHUR W.
 FENNER, E. D.
 FISCHER, LOUIS
 FORCHHEIMER, F.
 FRIEDLANDER, ALFRED
 FURRER, A. F.
 GARDNER, WILLIAM C.
 GEORGE, ARIAL WELLINGTON
 GILDERSLEEVE, NATHANIEL
 GITTINGS, J. CLAXTON
 GOODMAN, A. L.
 GRIFFITH, J. P. CROZER
 GRULEE, C. G.
 HAMILL, S. McC.
 HARTLEY, FRANK
 HEIMAN, HENRY
 HERRMAN, CHARLES
 HESS, ALFRED F.
 HOLT, L. EMMETT
 HOWLAND, JOHN
 HUBER, FRANCIS
 HYMANSON, A.
 ILLOWAY, H.

JOHNSON, W. L.
 JOPSON, JOHN H.
 KERLEY, CHARLES G.
 KILMER, THERON W.
 KIMBALL, REUEL B.
 KNOX, J. H. MASON, JR.
 KOPLIK, HENRY
 LA FÉTRA, L. E.
 LEFCOWITCH, C. H.
 MCCOY, JOHN
 MAGID, MAURICE O.
 MANNING, G. R.
 MILLER, D. J. M.
 MOOREHOUSE, GEORGE WILTON
 MOREHEAD, S. W.
 MYERS, ALBERT W.
 NICOLL, M., JR.
 NORTHRUP, W. P.
 PATTON, JOSEPH M.
 PISEK, G. R.
 POLOZKER, I. L.
 POYNTON, F. J.
 RACHFORD, B. K.
 RICHARDS, A. N., PH.D.
 ROTCH, THOMAS MORGAN
 RUGH, J. TORRANCE
 SCHELL, J. THOMPSON
 SCHORER, EDWIN H.
 SHANNON, WILLIAM
 SHAW, HENRY L. K.
 SHERMAN, DeWITT H.
 SNOW, IRVING M.
 SOBEL, JACOB
 SONDERN, F. E.
 SOUTHWORTH, THOMAS S.
 TAYLOR, A. S.
 THOMAS, J. J.
 THOMSON, JOHN
 THURBER, S. W.
 WELLINGTON, J. R.
 WESTCOTT, THOMPSON S.
 WHITE, C. Y.
 WILLIAMS, LINSLEY R.
 WILNER, ANNA A.
 WOODWARD, W. WELLINGTON.

RJ
 1
 A8
 v. 24

INDEX TO VOLUME XXIV

Abdominis, Fissura; Notes on a Case of.....	75
Abscess, Retropharyngeal	394
Abscesses Multiple and Gangrene of Toes. Case Treated by Bacterial Inoculations	689
Abt, I. A.....	275, 363, 555
Acid Intoxication following Anesthesia.....	877
Achondroplasia	793, 795, 870
Acker, George N.....	356
Adams, S. S.....	721, 895
Adenoid Operations	397
Adenoid Operations, Observations in 1,000.....	876
Adenitis, Chronic Cervical.....	761
Affections, Imitation	385
Ager, L. C.....	773
Alcoholism, Acute in Children.....	108
Alimentary Intoxication in Infants.....	870, 871
Allen, Thomas Grant.....	899
Alopecia Areata, Complete.....	709
Amaurotic Family Idiocy, Case of.....	768
American Pediatric Society, Minutes of May, 1907, Meeting....	538, 542
Amyloid Disease, Report of a Case.....	819
Anemia, Splenic; Pathogenesis and Therapeutics of Infantile.....	319
Anemia Infantum Pseudoleukemica.....	161
Anencephalus	608
Angioneurotic and Some Other Essential Edemas of Children....	854
Anorexia Nervosa in Children.....	801
Aorta, Stenosis of Isthmus of in Infant.....	191
Aphasia in Typhoid Fever.....	633, 715
Appendicitis, Ascaris Lumbricoides as Cause of.....	75
Appendicitis, Chronic; Early Diagnosis and Treatment of Acute..	234
Appendicitis in Infants.....	695
Arteriosclerosis in Children.....	111
Aspirator, New Syphon.....	13
Asphyxia Neonatorum, Use of Oxygen in.....	236
Ataxia following Measles, Case of.....	770
Atrophy, Infantile; Pathogenesis of.....	314
Backward and Defective Children.....	830
Bad Habits, So-called in Children.....	280
Baldauf, Leon K.....	813
Barlow's Disease; Anatomical Changes in the Bones in.....	473
Bartley, E. H.....	908
Bile Ducts, Congenital Obliteration of.....	633
Bladder Stones in Children.....	53
Blood, Opsonic Content of.....	400
Blood Cultures in Children.....	531

Blood Examinations, the Value of.....	822
Braunlich, A. R.....	215
Brennermann, Joseph	426
Bronchl, Hemorrhagic Casts of.....	529
Bronchiectasis, Surgical Aspects of.....	478
Butler, W. J.....	703
Buttermilk, Results of Cases Fed on.....	715

BIBLIOGRAPHY.

"The Practice of Pediatrics," by Walter Lester Carr, A.M., M.D.	122
"The' International Medical Annual; A Year Book of Treat- ment, and Practitioner's Index," by thirty-five contrib- utors, English and American.....	312
"The Nursling: The Feeding and Hygiene of Premature and Full-term Infants," by Pierre Budin.....	384
"Consumption: Its Relation to Man and His Civilization; Its Prevention and Cure," by John Bessner Huber, A.M., M.D.	460
"Progressive Medicine," edited by Hobart Amory Hare, M.D....	460
"Peterson's Obstetrics," edited by Reuben Peterson.....	461
"The New Hygiene," by Elie Metchnikoff.....	462
"Feeding Rules for Healthy Infants," by Charles Douglas, M.D.	463
"Essentials of Obstetrics," by Charles Jewett, M.D.....	536
"A Manual of Obstetrics," by A. F. A. King, M.D.....	536
"Thornton's Pocket Formulary".....	536
"Outlines of Human Embryology," by George Reese Satterlee, M.A., M.D.	537
"Handbuch der Kinderheilkunde," by Prof. Dr. M. Pfaundler and Prof. Dr. A. Schlosmann.....	701
"Treatment of the Diseases of Children," by Charles Gilmore Kerley, M.D.	851
"Diagnostics of the Diseases of Children," by LeGrand Kerr, M.D.	851
"Woman in Girlhood—Wifehood—Motherhood," by Myer Solis-Cohen, A.B., M.D.....	852
"A Pocket Text-Book of Diseases of Children," by George M. Tuttle, M.D.	853
Caloric Value of Infant Food, Importance of Estimation of.....	81
Caloric Value of Modified Milk, Determination of.....	86
Cane Sugar in its Relation to Some of the Diseases of Children....	752
Carpenter, Herbert B.....	932
Carpenter, Howard Childs.....	689, 819
Cerebral Palsies in Children.....	688
Cerebellum, Case of Tumor with Autopsy in Infant.....	472
Cervical Glands, Suppurative in Children.....	537
Chapin, Henry Dwight.....	8
Churchill, Frank Spooner.....	881, 895
Chloroform Poisoning	772
Chylothorax in Children.....	646
Chorea and Psoriasis, with a History of Rheumatism, Case Report.	859
Chorea, Fatal Cases of.....	866

Clabbered Milk for Sick Infants.....	673
Clock, Ralph Oakley.....	918
Codman, Chas. A. E.....	683
Colon, Dilated	396
Common Symptoms of Disease in Children.....	732
Concentrated Foods	878
Cotton, A. C.....	783
Coxa Valga, Bilateral.....	543
Crætinism, Endemic; Relation of to Other Types of Maldevelop- ment	65, 391
Czerny, Remarks on the Exudative Diathesis of.....	927
 Davisson, A. H.....	633
Deaf-Mute, Throat and Nasopharynx in.....	395
Decannulation and Intercricothyroid Tracheotomy.....	398
Dermatitis Herpetiformis in a Child Six Years Old, Case.....	790
Dextrinized Flour, Value of.....	790
Diabetes Insipidus	619
Diabetes in a Child.....	632
Diarrhea, Fluid Gelatin in.....	91
Diarrhea, Summer, Suggestions for Reducing Mortality in.....	522
Dietetic Management of Infants in Hot Weather.....	236
Diphtheria, Paralysis following; Treated by Antitoxin.....	417
Diphtheria, Relapses in.....	229
Dodson, John M.....	779
Dunn, Charles Hunter.....	241, 733
Duodenum, Perforation of.....	509
Duodenum, Congenital Stenosis of.....	813
Dyspeptic and Atrophic Infants: A Note on Measure of the Utiliza- tion of Fats	238
 Eaton, P. J.....	359
Eclampsia in Mother a Cause of Early Nephritis in Child.....	510
Ectopia Vesicae, Treatment of.....	76
Eczema Seborrhoeicum; A Case of with Spines.....	475

EDITORIALS.

"Relation of Teeth to Mouth-Breathing and to Health".....	43
"Practical Application of the Newer Knowledge of the Chem- istry of Milk".....	118
"The Diagnosis of Scarlet Fever".....	215
"The Bacterial Cause of Rheumatic Fever".....	308
"Mental Fatigue in Children".....	381
"The British Tuberculosis Commission".....	456
"The Diagnosis of Pulmonary Tuberculosis in Children"....	532
"On the Care and Management of the Wet-Nurse".....	613
"Second International Congress of the 'Gouttes de Lait'— For the Protection of Child Life".....	617
"Disturbed Sleep in Children".....	697
"The Epidemic of Anterior Poliomyelitis".....	773
"Harmfulness of the Rubber Comforter".....	847
"Collective Investigation of Anterior Poliomyelitis".....	849
"The International Congress on Tuberculosis".....	935

Edwards, Ogden M.....	659
Empyema in Children.....	477
Empyema, Surgical Treatment of.....	712
Encephalitis, Acute; Non-Suppurative.....	363
Endocarditis, Septic; Case of with Recovery.....	24
Enemata of Oil, for Chronic Constipation.....	776
Enterocolitis, The Dietetic Treatment of.....	719
Enterocolitis, Relation of to Adenoiditis in Infants.....	227
Enteritis and Appendicitis in Infant.....	317
Enteritis and Appendicitis in Infants.....	474
Epitrochlear and Other Lymph Nodes, Enlargement of in Infants..	602
Estivo-Autumnal Fever in a Child Two and a Half Years Old.....	918
Eye, Scrofulous Diseases of; Importance of Diseases of Nose in..	395
Eyes; A Report of Examination of in 420 School Children.....	479
"Exudation Diatheses," The.....	7
Exudative Diathesis of Czerny; Remarks on the.....	927
Fairbanks, A. W.....	768
Fat Content of Cow's Milk; Variation in.....	908
Fat in the Feces, a Clinical Test for.....	666
Feces; Nitrogenous Constituents of in Nursing Infants.....	79
Fenner, E. D.....	693
Ferments in the Urine of the Child.....	830
Fermentation, Intestinal; Use of Living Lactic Acid Bacilli to Combat in Infancy.....	241
Fever, Rheumatic; Clinical Aspects of in Childhood.....	475
Fischer, Louis	445
Forchheimer, F.	801
Foreign Bodies, Swallowed or Inhaled by Young Children.....	287
Formic Acid in the Treatment of Diphtheria.....	878
Fracture of Tibia, Intrauterine.....	789
Friedlander, Alfred	490
Furrer, A. F.....	502
Gardner, William C.....	24
Gastroenteric Obstruction in Early Infancy.....	874
Gastrointestinal Disease, Acute; Treatment of in Children.....	237
Gildersleeve, Nathaniel	689
Gittings, J. Claxton.....	321
Glottis, Spasm of; Complicating Whooping-Cough.....	454
Goodman, A. L.....	599
Griffith, J. P. Crozer.....	321, 633
Grippe, Epidemic and Cerebrospinal Meningitis; Use of Pyozyanase in	320
Grocco's Triangular Dullness.....	528
Grulee, C. G.....	510
Gualasanol against Oxyuris Vermicularis.....	30
Hale, Henry E.....	709
Hainill, S. M'C.....	92
Harellip and Cleft Palate, Conservatism in the Treatment of Infants with	719
Hartley, Frank	207

Hatfield, M. P.....	781
Heart Disease, Congenital; Lecture on.....	71
Heart in Late Childhood.....	703
Hecht, D'Orsay	546
Heart Sounds, Impure; in Children.....	476
Helman, Henry	1
Hektoen, Ludwig	777
Hematemesis: Report of Case Complicating Malaria.....	316
Hemiplegia, Postdiphtheritic	546
Hemorrhagic Casts of Bronchi in Pneumonia.....	529
Hemophilia in the Newly Born.....	455
Herpes Simplex, the Nature of.....	717
Herrman, Charles	522, 711
Hess, Alfred F.....	602
Hiccough, So-called Physiological of Infants.....	93
Hip, Congenital Dislocation of.....	544
Hip Dislocation, Congenital; Final Results of Lorenz Operation for Bloodless Reduction of.....	234
Holt, L. Emmett.....	641
Howland, John.....	401, 590
Huber, Francis.....	13, 295
Human Milk in the Treatment of Infantile Atrophy.....	877
Hydronephrosis, Congenital.....	375
Hydrancephalocele and Spina Bifida.....	348
Hymanson, A.	927
Hypertrophy, Cardiac in Infancy.....	392
Illoway, H.....	99
Immunity, Duration of, after Injection of Antitoxin.....	78
Imperforate Anus, Case of.....	683
Indicanuria	865
Infants, Breast-fed; Weight of.....	321
Infant Feeding, Scientific; Teaching of.....	8
Infant Feeding, System Based on Calories.....	549
Infants' Stools, the Protein Content of.....	867
Inguinal Fold, Closed; Determination of Normal Temperature of..	239
Intervertebral Rheumatism.....	771
Intestinal Diseases, Acute; Prevention of in Summer.....	480
Intubation in Whooping-Cough.....	696
Intubation Tubes, Celluloid.....	30
Intussusception	232
Intussusception	233
Intussusception, Infantile; Acute.....	230
Intussusception, Case of Subjected to Operation.....	399
Iron, Metabolism of in Infants.....	425
Jaundice, Congenital.....	633
Jaundice, Malignant; Case of following Scarlet Fever.....	226
Jennings, W. B.....	626, 709
Johnson, W. L.....	696
Jopson, John H.....	683
Judson, C. F.....	862

Kidney, Tuberculosis of.....	266
Kerley, C. G.....	752
Kilmer, T. W.....	112
Kimball, R. B.....	207
Kinderheilkunde als Specialitat.....	159
Knox, J. H. Mason, Jr.....	516
Koplik, Henry	1, 161
Lackner, Ernest.....	549
La Fétra, L. E.....	418
Laryngeal Stenosis, Diphtheritic.....	765
Laryngeal Stenosis, Diphtheritic in Infants, the Operative Treatment of	718
Laryngeal Stridor, Congenital.....	313
Lefcowitch, C. H.....	608
Little's Disease, Case of.....	709
Lloyd, Samuel.....	712
Lumbar Puncture; Diagnostic, Prognostic and Therapeutic Value of in Newborn.....	479
Long, EM.....	619
Lymph Nodes, Tuberculous Cervical.....	418
Lymph Nodes, Bronchial, Tuberculous; Pressure Symptoms Due to..	68
Lymph Nodes, Trachea-Bronchial; Tuberculosis of.....	392
Lymphoid Tissue of Throat; Malignant Diseases of.....	394
McCoy, John.....	831
Magid, Maurice O.....	454
Marasmus, Thyroid Gland in Relation to.....	472
Maternal Impressions, with Report of a Case.....	823
Measles, An Epidemic of.....	716
Measles, Case of, Superimposed on Scarlatina.....	359
Measles, Early Sign of.....	358
Measles, Gastrointestinal Type of.....	12
Measles, Recent Studies in.....	228
Mehlkinder	77
Meningitis, On the Bacteriology of.....	881
Meningitis, Grip.....	721
Meningitis, Cerebrospinal, Case of.....	769
Meningitis, Cerebrospinal	696
Meningitis, Epidemic Cerebrospinal, the Etiology and Diagnosis of..	718
Meningitis, Suppurative; Operative Treatment of.....	42
Meningitis, Tuberculous; the Therapeutic and Symptomatic Value of Lumbar Puncture in.....	79
Meningitis, Tuberculous; Cytodiagnosis and Lumbar Puncture....	521
Meningitis, Tuberculous, the Clinical History and Recognition of..	718
Meningocele, Case of.....	115
Meningocele, Case of Unusual Size.....	234
Mental Defects in School Children, Detection of.....	879
Metabolism, Importance of Inorganic Salts in.....	206
Milk: A Study of Hospital and Dispensary Milk.....	516
Milk and Tuberculosis.....	822
Milk, Cow's; Choice of.....	80
Milk, Lab Ferment and Digestion of.....	121

Milk Solids, Poor and Rich in Fats.....	17
Milk Supply of New York City, Review of Efforts to Improve.....	667
Milk, Rapidity of Absorption of Odors of.....	223
Miller, D. J. M.....	375, 529, 545, 766
Mongolian Idiocy	795
Mongolian Pigment Spots, a Contribution to the Study of.....	867
Moorehouse, George Wilton.....	86
Moorehead, S. W.....	108
Mortality, Infant	800
Mortality, Infantile; Its Principal Cause.....	294
Multiple Bone Tumors, Case of.....	710
Mumps, Cytodiagnosis of.....	116
Mycotic Carditis, Case of.....	711
Myers, Albert Wm.....	914
Myxedema, Congenital; Its Skeletal Growth.....	224
Nasopharynx, Diseases of in Infancy.....	868
Nervous Disorders in Children.....	879
Newborn, Genital Crisis in.....	274
Newborn, Infections in the.....	760
Northrup, W. P.....	267
OBITUARY: James Finlayson, M.D., LL.D.....	117
Osteogenesis Imperfecta	791
Paracentesis of Drum Membrane, Indications for and Technique of.	831
Paralysis, Abducent Nerve; Case of.....	18
Pasteurization	516
Patellar Reflex, an Aid in Eliciting.....	853
Patton, Joseph H.....	674
Peritonitis, Tuberculous in Children.....	136
Percentage Feeding, Use in Practice of the Theoretical Resources Provided by.....	733
Pigment Spots; so-called Mongolian.....	426
Pigmented Spots in Sacral Region of White and Negro Infants....	711
Pigmentation, Generalized, and Palmar Keratosis.....	38
Pneumonia, Afebrile.....	599
Pneumonia, Lobar with Unusual Temperature.....	295
Pneumonia, Traumatic.....	279
Pneumonia, Unresolved, with Bronchiectases.....	555
Pneumococcus Arthritis in Infants and Children.....	502
Polozker, I. L.....	31
Poisoning, Carbolic Acid; by Rectal Injection.....	356
Postdiphtheritic Hemiplegia	546
Poynton, F. J.....	308
Proteid in Infant Feeding.....	899
Proteids of Milk, Some Conclusions from Our Knowledge of the....	744
Pseudomasturbation in Infants.....	561
Pseudomuscular Dystrophy and Unresolved Pneumonia.....	555
Pseudorheumatism in Mumps.....	865
Pyelitis in Infancy and Childhood.....	445
Pyloric Stenosis, Congenital.....	796

Pylorus, Congenital; Hypertrophic Stenosis of.....	228
Pylorus, Hypertrophic Stenosis of.....	76, 207
Rachford, B. K.....	348, 561
Refraction, Errors of among Children attending Elementary Schools in London.....	78
Résumé and Deductions from Medical Trip through United States..	229
Resonance, Impaired in Normal Children.....	92
Retropharyngeal Abscess, Report of a Case in a Girl Eleven Years Old	932
Rheumatic Carditis in Children.....	674
Rheumatism; Acute in Infant.....	7
Rheumatism, Cerebral, Chorea Considered as.....	70
Rheumatoid Arthritis in a Child of Six Years.....	693
Rhinitides of Nursing Infants.....	69
Richards, A. N., Ph.D.....	401
Rickets, Character of Urine in.....	225
Rickets, the Etiology of.....	866
Ringworm, Extensive with Ulceration of the Umbilicus.....	396
Ringworm, Scalp; Treatment of.....	123
Röntgen Ray, A Study of Early Conditions of Osteomyelitis by the..	481
Rotch, Thomas Morgan.....	287, 481
Rötheln, A Further Note on the Prodromal Period in.....	766
Rubri Nasi; Granulosis.....	476
Rugh, J. T.....	544, 823
Salt-Free Dietary in the Treatment of Scarlet Fever and Acute Nephritis	720
Sarcoma in a Child of Four Years, Case Report.....	788
Sarcoma of the Kidney in Children, with Report of a Case.....	922
Scarlatina, Hemorrhagic Complications.....	857
Scarlatina, Otitis Media as a Complication or Sequel of.....	227
Scarlatina, Serum Treatment of.....	399
Scarlatinal Nephritis, Prevention of.....	880
Scarlet Fever, Body Weight and Milk Diet in.....	228
Scarlet Fever, Symposium on; Chicago Pediatric Society.....	777-785
Scarlet Fever or Fourth Disease, Which?.....	97
Scarlet Fever, Treatment of.....	31
Scleroma Neonatorum in Twins.....	240
Scurvy, Infantile; Clinical Lecture on.....	72
Scurvy in Children Produced by Commercial Sterilized Milk.....	463
Schell, J. T.....	761
School Girls; Strenuous Life of.....	114
Schorer, Edwin H.....	516
Schwarz, Herman.....	854
Serum Therapy in Typhoid Fever in Young Children.....	720
Shannon, William	922
Shaw, Henry L. K.....	813
Sigmoid Sinus Thrombosis.....	318
Sherman, DeWitt H.....	646
Snow, Irving M.....	297
Sobel, Jacob.....	38

SOCIETY REPORTS.

New York Academy of Medicine. Section on Pediatrics	49, 124, 464, 619, 709, 854, 938
Chicago Pediatric Society.....	54, 140, 546, 703, 777, 858, 945
Philadelphia Pediatric Society.....	137, 386, 543, 632, 714, 786, 862, 948
Report of Milk Commission.....	221
Sondern, F. E.....	94
Southworth, Thomas S.....	118, 199, 744
Spalding, H.....	782
Status Lymphaticus; Clinical Diagnosis of.....	226
Spina Bifida.....	714
Stammering; Importance of Early Treatment.....	395
Status Lymphaticus and Enlargement of the Thymus.....	490
Status Lymphaticus, Symptoms of in Infants and Young Children...	590
Stenosis of Duodenum Congenital, Report of Case.....	813
Stools; Chemical Reaction of Infants.....	474
Stools, Green; Ferment Action.....	314
Strangulated Hernia in Infants.....	876
Streptococcus Erythema, Relation of to Scarlet Fever.....	873
Stuttering, Examination of in School Children in the Netherlands..	319
Syphilis, Clinical Lecture on Transmission of to the Third Generation	159
Syphilis, Congenital; Diffuse Hyperplastic Laryngitis and Pharyngitis of.....	394
Syphilis, Congenital, Diseases of the Aorta in.....	700
Syphilis, Congenital; Spirochetæ Pallida in.....	67
Syphilis, Congenital.....	626
Syphilis, Congenital; Spirochetæ Pallida and Changes in Organs in..	225
Syphilis, A Family Infected with.....	75
Syphilis, Present Position of Experimentation on.....	66
Syphilis, Visceral in Children, Cases of.....	623
Tetanus	317
Tetany, Form of Calcium Poisoning.....	70
Tetany, Case Report.....	858
Tetany, Infantile; Pathological Examination of Parathyroids in Cases of.....	225
Tetany, Spasmophilia; Relation of Parathyroid Glands to.....	70
Therapy, Ferment; of Infants.....	400
Thomson, John.....	280
Thomas, J. J.....	81
Thymus; Contribution to the Physiology and Pathology of.....	65
Thymus, Enlargement of, and Status Lymphaticus.....	490
Thyroid, Implantation in the Spleen, for the Cure of Cretinism....	864
Tinea Tonsurans.....	862
Torticollis	73
Trachea, Foreign Bodies in.....	398
Trachea; Tumors of.....	398
Trachea and Flies.....	542
Tuberculosis, Examination as to the Frequency, Localization and Extent of.....	473
* Tuberculosis; Human and Bovine.....	66
Tuberculosis; Infantile, Some Points in.....	641

Tuberculosis; Infantile.....	501
Tuberculosis; Intestinal in Nursing Baby.....	297
Tuberculosis of the Brain.....	713
Tuberculosis, Playgrounds in the Prevention of.....	818
Tuberculosis, Pulmonary, in School Children.....	708
Tuberculosis; Transmission by Means of Casein of Food Stuffs....	160
Tumor, Cranial; Case of Congenital.....	472
Tumors; Ovarian in Children.....	17
Typhoid Fever, Clinical Study of Relapses in Children.....	1
Typhoid Fever, Hemorrhagic, with Report of Two Cases.....	841
Typhoid Fever in Infancy and Childhood.....	659, 786
Typhoid Infection Conveyed by Convalescent Infant.....	199
Tympano-Mastoid Region; Surgery of in Infant and Young Child..	77
Twenty-three Hour Treatment.....	267
Umbilical Hernia, Congenital.....	874
Urine, Acidity of; Influence of Alkalies on Degree of in Anemia..	214
Urine, Ehrlich's Dimethylaminobenzaldehyde Reaction of in.....	224
Urine; Incontinence of.....	214
Urine; Incontinence of.....	68
Urine, Reducing Power of.....	275
Urine, Significance of Albumin and Casts in.....	94
Urinary Tract, Acute Infections of in Infants.....	159
Vaccinia, Generalized; in an Unvaccinated Three-year-old Child....	79
Vomiting, Acetonemic and Infantile Hysteria.....	315
Vomiting; Difficulties in Surgical Diagnosis and Treatment of Cases Associated with.....	160
Vomiting, Recurrent, Ending in Death.....	868
Vomiting; Recurrent of Children.....	401
Vomiting, A Case of, with Acetonuria and Fatty Metamorphosis of the Liver	914
Walker, J. K.....	332
Wellington, J. R.....	115
West, J. C.....	858
Wet-Nursing, Modified.....	192
Westcott, Thompson S.....	192
White, C. Y.....	375
Williams, Linsly R.....	667
Whooping-Cough; Treatment by Improved Belt.....	112
Woodward, W. W.....	841
Wilner, Anna S.....	18
X-Ray in Treatment of Status Lymphaticus.....	490
Young, James K.....	543

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

JANUARY, 1907.

[No. 1.]

Original Communications.

A CLINICAL STUDY OF RELAPSES IN TYPHOID FEVER OF CHILDREN.*

BY HENRY KOPLIK, M.D.,

AND

HENRY HEIMAN, M.D.,

New York.

The relapse being almost as varied in its manifestations, duration and severity as the original attack of typhoid fever, the term is one difficult of exact definition. While the diagnosis of relapse is to some extent a matter of individual judgment, yet we should regard as essential for the diagnosis a natural interpyrexial period and the presence of at least one or more of the three following signs: enlargement of the spleen, a prolonged temperature elevation and roseola. We may define a relapse as a repetition after complete defervescence of some of the essential signs of the primary disease.

History.—Probably the first authoritative report of true relapses in typhoid fever was published in 1831 in Germany by Schultz,¹ who, in 55 cases, had observed three relapses. These were attributed by the author to taking cold or excess in diet. Perhaps the first authentic cases of relapse observed in children are those reported in 1839 by Taupin² in France. The credit for the first pathological explanation of the occurrence of relapses is due to an Englishman, Stewart,³ who, in 1839, performed autopsies during relapses and observed in the enteric lymphoid tissue changes corresponding in stage and extent to those occurring in original attacks.

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, June 1, 1906.

We propose in this paper to analyse 24 relapses which occurred in 160 cases of typhoid fever treated during the past five years in the children's service at Mount Sinai Hospital.

Age, Frequency and Duration.—These relapse cases varied in age from two and one-half to fourteen years; the average age was nine years. There were thirteen males and eleven females. There were four double relapses and one triple relapse. The proportion of relapses to the whole number of cases of typhoid was 15 per cent. Comparing our own statistics with those of Henoch⁴ and Blackader,⁵ we find that all three correspond closely. In Henoch's 97 cases of typhoid in children there were 16 relapses, or 16.4 per cent. Of 100 similar cases studied by Blackader, fifteen patients had relapses. On the other hand, Heubner,⁶ Griffith⁷ and Morse⁸ find that the percentage in relapses in children is not higher than that in adults. But, according to Curschmann,⁹ "the general rule that relapses are likely to be more frequent the younger the patient is applicable also to childhood. The tendency to relapses is, without doubt, more pronounced at this period of life than in later years. Exceptional contradictory statements are based either upon too small statistics or upon exceptional epidemics and endemics. . . . There occurred in Hamburg in 1886: Relapses in adults, 13.4 per cent.; in children, 19.5 per cent. In Leipsic: Relapses in adults, 12.5 per cent.; in children, 19.1 per cent."

Of the original attacks of typhoid fever in which relapses occurred 11 were severe, 7 were of moderate severity and 6 were mild. There had been a positive Widal reaction during the primary attack in all but 3 of the cases, in 2 of which the Widal became positive during the relapse. The duration of the afebrile interval between the time of defervescence and the beginning of the relapse varied from four to fifteen days—average eight days.

Gerhardt,¹⁰ Jacobi,¹¹ Curschmann,⁹ Ziemssen¹² and Eichhorst¹³ are agreed that persistent enlargement of the spleen after defervescence is strong presumptive evidence that a relapse will supervene. Jacobi says that "the greatest care must be taken in those cases in which the spleen when tumefied during the progress of the disease will not nearly assume its normal size about the middle of the third week. When it remains large a relapse may be looked for." In but 11 of our cases did the spleen remain palpable during the afebrile period. We do not believe that there is any reli-

able means of foretelling a relapse. Certain signs which various writers have observed after defervescence and for which they claim diagnostic significance in this regard—*e.g.*, sub-normal temperature, continued anorexia or diarrhea—are too inconstant to be of any value.

Duration of Relapses.—Counting the double and triple cases, there were in all 30 relapses, of which the longest duration was thirty-seven days, the shortest six days, and the average thirteen days. The average duration of the twenty-four primary attacks was twenty-four days.

Symptomatology.—Temperature.—The guide in determining the duration of a relapse was the temperature curve. When, after defervescence, there occurred a rise of temperature above 100° F., together with other essential signs, the relapse was regarded as having begun; and not until the temperature remained below 100° for a reasonable period was the relapse considered terminated. In 7 of our cases there was at the onset an abrupt rise of temperature, while in the remaining 23 cases the rise of temperature was more or less step-like, yet it always reached its acme within three days. Toward the end of the relapse the drop of temperature to normal was also generally rapid; fall by lysis was rare.

With the above exceptions, the temperature curve in the individual relapses shows nothing characteristic. In the great majority of the cases it remained continuously high when the fastigium was once reached; only in a few of the cases was it remittent in type. No constant relationship could be discerned between the temperature curve in the original attack and that in the individual relapses.

When, however, we come to consider the temperature curve in the cases of double and triple relapses, we note that three constant conditions obtained: (1) The four double and the one triple cases all followed severe original attacks; whereas, most of the single relapses followed mild or moderately primary attacks. (2) The temperatures in these cases were higher than in the single relapses. (3) The repetition showed lower temperatures than the previous relapse.

These points are shown in the following table:

Number of Case.	Character of Primary Attack.	Temperature in First Relapse.	Temperature in Second Relapse.	Temperature in Third Relapse.
2	Severe.	100-105.6°F.	100-103.6°F.	
8	Very severe.	100-105°	100-103°	
18	Severe.	100-105.2°	99-103.4°	
19	Very severe.	99-104.6°	99-103.8°	
23	Severe.	100-105.4°	100-104°	99-103°F.

Pulse.—In children, as distinguished from adults, dicrotism and slowness of the pulse, generally absent in the original attack, were absent in relapses.

Spleen.—Palpable spleen was found in every one of the thirty relapses.

Roseola.—In twenty-two of the thirty relapses roseola was present. (73.3 per cent.)

Widal.—In all but one of the relapses in which the Widal reaction was made during the relapse, it was positive.

Mental Symptoms.—In 21 of the cases the sensorium was clear. Five had delirium (16.6 per cent.). In one case there was stupor in one marked apathy and in two of the patients (thirteen and fourteen years old respectively) there was mild melancholia.

Abdominal Symptoms.—In 14 of the cases (about half) there was abdominal pain; in 3 cases (10 per cent.) there was also meteorism of a moderate grade. In 16 of the cases there were no abdominal symptoms.

Leukocyte Counts.—During all the relapses leukocyte counts which were frequently made often showed a leukopenia. The lowest individual count was 2,800; the highest 14,000; the average of all the counts was 6,900.

Complications.—None of the severe complications of typhoid fever were present in the relapses, the only ones being furunculosis (2 cases), parotitis (1 case) and melancholia (2 cases).

Mortality.—All patients with relapses were discharged cured.

Etiology.—According to Jacobi¹¹ "relapses are very frequently the result of improper food, which will irritate the intestinal ulcerations, the process of whose healing is thereby interrupted." In 14 of our relapse cases the patients had nothing but fluid diet before the relapse. In 10 cases semi-solid food—eggs, strained gruels and milk-toast—were given before one week of normal temperature after the primary attack had elapsed; in only 4 of these cases, however, did the relapse come on in a manner to

excite our fear that indiscretion in diet had been its exciting cause. We are really in ignorance as to the exact etiological factors favoring a secondary auto-infection with the typhoid poison.

CONCLUSIONS.

Relapses in typhoid fever are more common in children than in adults—about 15 per cent. in the former. The mortality is exceedingly low. The usual duration of a relapse in a child is from one to two weeks. As a rule the temperature is continuously high between a rapid rise at the onset and a rapid fall to normal at the termination of the relapse. A constant symptom in addition to the prolonged temperature elevation is enlargement of the spleen; roseola is present in about 75 per cent., leukopenia in about 60 per cent., and mild abdominal symptoms in about 50 per cent. of relapses in children. Complications in these cases are mild and infrequent. For the prediction of a relapse no reliable signs are furnished by the character of the interpyrexial period nor by the course, duration and severity of the original attack. Persistent enlargement of the spleen after defervescence occurs in a fair proportion of relapse cases; and a relapse following a mild primary illness is not as likely to be repeated as one occurring after a severe original attack.

For valuable aid in this paper the writers are indebted to Dr. H. F. L. Ziegel, formerly house-physician at Mount Sinai Hospital.

DISCUSSION.

DR. ROTCH.—I would suggest that the bacteriological examination of the blood is a reliable adjunct in the diagnosis of a relapse in typhoid fever, as relapses are often difficult to determine.

As the Widal reaction at any rate lasts for a long time it is not of much value in determining a relapse; on the other hand, it may happen that the reappearance of the typhoid organism in the blood will definitely determine the diagnosis. Some very good work has already been done in connection with blood cultures in the relapses of typhoid fever, the organism having been found to reappear at this period.

DR. ABT.—It has seemed to me in studying some of my cases that where the spleen remained large, when the temperature had fallen to normal, these were the cases that tended to relapse. In

one case we were led to believe that the relapse was due to a single intestinal ulcer which persisted. We came to our conclusion in the following way: A child of three was convalescing from an uneventful typhoid. After a few days' normal temperature the relapse became evident. The temperature again became very high, and during the first week of the relapse the child had an intestinal perforation. The case was immediately operated on; the perforation closed, and from that moment on the temperature remained normal, and the child made a good recovery. We concluded, therefore, that there had been one persistent ulcer, which was responsible for the relapse, and which eventually perforated. After the ulcer was obliterated by suturing it, the whole disease process came to an end.

BIBLIOGRAPHY.

1. Schultz, Car. Hen. "De Enteromesenteritide Contagiosa Biponti anno 1830." Grassata Monachii J. Rohsl, 1831. Quoted by Bena vide infra.
2. Taupin. "Recherches Cliniques sur la fièvre Typhoïde Chez les Enfants." Journal de Connaissances. Med.-chir. le 5 November, 1839.
3. Stewart, A. P. "Some Considerations on the Nature and Pathology of Typhus and Typhoid Fever, Applied to the Solution of the Question of the Identity or Non-identity of the Two Diseases." The Edinburgh Medical and Surgical Journal, 1840, p. 289.
4. Henoch. (1) "Vorlesunger ueber Kinderkrankheiten." 2 Aufl. (2) "Ueber den Typhus Abdominalis des Kindesalters." Charité-Annalen, 11 Jahrg.
5. Blackader. "Enteric Fever in Childhood." ARCHIVES OF PEDIATRICS, 1900.
6. Heubner. "Lehrbuch der Kinderkrankh." 1903.
7. Griffith, J. P. C., and Ostheimer, M. "Typhoid Fever in Children." American Journal of the Medical Sciences, Vol. CXXIV., No. 5.
8. Morse, J. L. "Typhoid Fever in Children, with an Analysis of 284 Cases." Boston Medical and Surgical Journal, 1896, Vol. XXXIV.
9. Curschmann, H. "Nothnagel's Encyclopedia of Practical Medicine." 1901.
10. Gerhardt. "Lehrbuch der Kinderkrankh." 1897.
11. Jacobi, A. "Therapeutics of Infancy and Childhood."
12. Von Ziemssen, Hugo Wilhelm. "Der Typhus in München während der letzter 20 Jahre." Rep. Münch. Med. Woch., 1886.
13. Unger. "Lehrbuch der Kinderkrankh." 1904.
14. Baginsky, Adolph. (1) "Typhoid Fever in Children." Boston Medical and Surgical Journal, January 7, 1904. (2) "Lehrbuch der Kinderkrankh."
15. Monti. Kinderheilkunde. 1901.
16. Osler, William. "Relapses in Typhoid Fever." Journal of American Medical Association, Chicago, 1897.

17. Fitz, Reginald H. "Typhoid Fever at the Massachusetts General Hospital During the Past Seventy Years. Mortality, Intestinal Hemorrhage, Perforation and Relapse. Monograph." 1902.
18. Rudisch, J. "A Study of the Cases of Typhoid Fever Observed in Mount Sinai Hospital from 1893 to 1898." Mount Sinai Hospital Reports, 1899.
19. Holt, L. E. "Diseases of Infancy and Childhood." 1905.
20. Koplik, H. Id. 1906.
21. Ashby and Wright (Northrup). Id. 1900.
22. Abt, Isaac A. "A Report of 90 Cases of Typhoid Fever in Infants and Children." New York Medical News, November 1, 1902.
23. Stowell, W. L. "Enteric Fever in Childhood." ARCHIVES OF PEDIATRICS, 1901.
24. Bena, H. "Ueber Typhusrecidive, Inaugural-Dissertation." Strasburg, 1893.

The "Exudation Diathesis."—Czerny suggests (*Jahrbuch für Kinderheilk*, Vol. LXI., No. 1) that a congenital anomaly may be responsible for various affections accompanied by exudation, such as eczema, recurring bronchitis, tonsillitis, retropharyngitis and other affections of mucous membranes. They form a group with features in common, suggesting a congenital anomaly of the juvenile organism. The course of the individual cases is determined by the character of the food, the condition of the nervous system and intercurrent infections. Avoidance of all overfeeding, a vegetable diet, excluding even eggs, and systematic disregard of exaggerated subjective disturbances and scrupulous avoidance of intercurrent infections are the most important means of combating this "exudative" diathesis.—*Journal of the American Medical Association*.

Acute Rheumatism in an Infant.—Shengelidze describes (*Roussky Vrach*, February 5, 1905) a case of articular rheumatism of the acute type in an infant aged about two weeks. The mother suffered from the same trouble while nursing this little girl. The infant had the typical swelling, redness, pain, etc., at the ankle, and at one of the interphalangeal joints, fever, etc. The author found but a few similar cases in literature. He thinks that rheumatism may be transmitted by the mother to a nursing infant. Schaefer believes that the disease may be transmitted through the placenta. It is remarkable that heart complications have thus far not been observed in infants with acute rheumatism, but it is possible that they develop later when these infants are no longer under observation. A noteworthy feature in the case reported was an exudate in one of the maxillary articulations.—*New York Medical Journal*.

THE TEACHING OF SCIENTIFIC INFANT FEEDING.*

BY HENRY DWIGHT CHAPIN, M.D.,

New York.

Many years' experience in teaching the subject of artificial infant feeding to post-graduate students has shown that the subject is not as clear to them as it might be and that they do not look upon it as being established on a firm scientific basis. The medical profession is divided into camps composed of followers of different teachers who often entertain widely differing views.

To-day very few believe that all milks are made up of the same elements and differ only in their percentages and reactions. At any rate, no one follows this theory entirely in practice, although it has been widely taught. It naturally is difficult to arouse the enthusiasm of the general practitioner when he sees theory and practice wide apart and the teachers not following their own doctrines in practice.

The subject of artificial infant feeding can not progress as it should, or be on a scientific basis, until some principles are established beyond dispute that will not have to be propped up by mere authority, and which will be almost self-evident.

Science has advanced in other fields by patient observation of facts and phenomena, and thence working out general laws and principles, and it is by following this plan that the science of infant feeding will be established.

One of the first things to be settled is a uniform nomenclature so that terms shall be used in a restricted and definite manner. Much of the work done on infant feeding has less value than it ought to have from the amount of labor expended, because it is uncertain just what many terms were intended to cover. For instance, in the earlier analyses of milk all of the nitrogenous bodies were called casein, then they were called albumin, albuminoids and proteids. Later, the word casein was applied to the curd-forming portion of the proteids. It is not at all unusual to find these terms used indiscriminately in modern text-books. In some writings albumin means the soluble proteids remaining after the curd has been removed and in other articles it is used to designate the curd-forming proteids. Surely nothing but confusion

*Read before the Eighteenth Annual Meeting of the American Pediatric Society, at Atlantic City, May 31, 1906.

could arise from comparing a method in which food containing 1 per cent. albumin means diluted milk and another in which it means whey. This may seem extreme, but it is actually found in books published in 1906. But it is not only in such instances that confusion exists. On the face of it, a statement that an infant is taking 1 per cent. proteids of cow's milk seems very simple and not open to more than one meaning, but it may mean several things. If the milk is diluted with water the proteids have one kind of property, and another if diluted with lime-water, another if bicarbonate of soda is added, and still another if an addition of citrate of sodium is made. When lactic acid is present, as in buttermilk feeding, the proteids have properties quite unlike those when the previous additions are made.

The introduction of the term caseinogen has increased the confusion. A food is often stated to contain certain percentages of caseinogen when it does not contain caseinogen at all in the sense in which the term is employed in infant feeding, where it means a portion of the natural proteid of fresh milk. Already caseinogen has two meanings in speaking of cow's milk, and is applied to widely different substances, and it is also recognized that there are different kinds of caseinogen.

Halliburton adopted the term caseinogen for the mother substance of the curd formed in milk by rennet. The Germans called this mother substance casein and the curd, paracasein. To quote Mann¹:—"Halliburton reserves the expression casein for coagulated caseinogen, and uses the term caseinogen for the native albumin, so as to express the analogy which exists between the coagulation of the mother substance of casein and the mother substance of fibrin and myosin, which he terms fibrinogen and myosinogen." In other words, the term caseinogen was employed for convenience, and really to cover a mystery, for the substance that formed a coagulum in milk was not understood. Since this term was proposed many chemical investigators have been working on milk and they have solved the mystery of the substance called caseinogen by Halliburton. The proteid of milk that forms the curd is a chemical combination of lime and what Van Slyke and Hart,² who are the foremost investigators of the chemistry of milk, term free casein. They call its combination with lime, in fresh milk, calcium casein. This free casein can unite with alkalis, alkalies or acids, and can be separated from its combinations

and be used as a free acid or base like hydrochloric acid or sodium hydrate.

Combinations of casein with ammonium, lithium, sodium, strychnin and caffein and other bases are known. Sour milk curds are a combination of casein with lactic acid. Similar curds may be made with sulphuric, hydrochloric, or acetic acid.

The term caseinogen was originally applied to the portion of the proteids of cow's milk that form curds under the action of rennet, or the calcium casein of Van Slyke and Hart. But the name caseinogen has been transferred from this compound by some writers to the free casein that combines with the lime, while what was formerly called caseinogen is now called dicaseinogenate of calcium. When the milk proteid or caseinogen is combined with ammonium it is called caseinogenate of ammonium; plasmon is said to be a caseinogenate of sodium.

In medical literature, caseinogen is supposed to mean the normal proteid of cow's milk (calcium casein or dicaseinogenate of calcium), but it is also applied to other compounds. When lime-water is added to milk until it is neutral to phenolphthalein, a new compound of casein or caseinogen and calcium is formed which does not form curds with rennet. This product is called basic calcium casein by Van Slyke and Hart and would be caseinogenate of calcium if the normal compound of milk was called dicaseinogenate of calcium.

Now, in feeding mixtures made of milk and lime-water or other alkaline additions, or of whey, cream and lime-water, is there any caseinogen present, assuming caseinogen to mean the natural proteid of the milk? The caseinogenates of potassium, sodium or of calcium which are formed when alkalies or citrate of sodium are added to milk are not curded by rennet and do not have the properties of the caseinogen of normal milk. How fallacious it is to state that these different mixtures contain caseinogen, and of what scientific value are the reports on the use of caseinogen in infant feeding? There is just as much justification for calling the different proteid compounds derived from milk caseinogen as there would be in saying that patients who were given iodid, bromid or bicarbonate of potassium were taking potassium.

It would be more scientific to state what form of casein is being fed and not use a blanket term that covers either normal milk or milk whose digestive properties have been completely or

partly altered. Comparison of dissimilar things teaches nothing.

It would greatly simplify matters and help in making comparisons if in reporting feeding cases the form in which the casein was given was stated as follows:—

Simple diluted milk.....	Normal calcium casein
Milk and lime-water.....	Basic calcium casein
Milk and bicarbonate soda..	Basic calcium casein and antacid
Milk and citrate soda.....	Sodium casein
Buttermilk	Casein lactate

It is important that some such classification be agreed upon, as these different casein compounds have different digestive properties. For instance, when normal milk enters the stomach the rennet ferment changes the normal calcium casein into paracasein and this is precipitated as a soft curd.

When milk and lime-water or other alkali reach the stomach the rennet does not act on the basic casein and form the curd unless acid is present to neutralize the added alkali.

Bicarbonate of soda when added to milk in the recommended quantities of one to two grains to the ounce of food not only converts the casein into a basic compound, but the excess of the bicarbonate of sodium which is always added serves to neutralize any acid that might be secreted by the stomach, and thus prevents curding.

The addition of citrate of sodium so alters the casein that rennet will not form a curd at all and the food remains fluid.

When buttermilk is fed, the casein is not in combination with calcium or other base, but with lactic acid and will not be acted upon by rennet.

From the foregoing it will be apparent that when foods having such different properties are used it is important to report more than their percentage composition, as their behaviors in the stomach are so unlike.

No attempt has been made to point out all of the discrepancies there are between teaching and practice, but only to show what a crying need there is for some effort toward more system in the reporting of feeding cases and methods as well as in teaching.

DISCUSSION.

DR. COTTON.—I should like to ask Dr. Chapin if he means that the addition of sodium citrate inhibits coagulation regardless of the quantity of sodium citrate used?

DR. SOUTHWORTH.—I am fully in accord with Dr. Chapin as to the necessity for differentiating these combinations of casein in such a way that we may know exactly what the child is being fed.

Where he speaks of dicaseinogenate of calcium, I would suggest that a better term for the calcium casein of cow's milk would be bicaseinate of calcium, because there is in it a radical which can be satisfied by further addition of the alkali forming the caseinate of calcium. We may then have a caseinate and bicaseinate of calcium just as we have a carbonate and bicarbonate of soda. It is simply a shortening of terms and gets rid of the term caseinogen, to which there are objections.

DR. CHAPIN.—In answer to Dr. Cotton's question, my experience is that sodium citrate does always inhibit the action of the rennin ferment and that is the way it produces its effect; it throws the digestion of the milk out of the stomach into the bowels, which it is desirable to do sometimes.

My object in presenting this paper was to call the attention of teachers to this subject. The knowledge of the chemistry of milk has advanced to a stage where definite chemical compounds are recognized and our teaching has not apparently gotten up to that stage and when it does, and we can agree among ourselves upon terms (these are only tentative), we will not only make the subject plainer to the practitioner, but will know ourselves the kind of food products we are putting into the stomachs of the children.

REFERENCES.

1. Chemistry of the Proteids. Gustav Mann. 1906.
2. Bulletin No. 261. N. Y. Agr. Exp. Sta. (Geneva), Jan., 1905.
3. Some of the Relations of Casein and Paracasein to Bases and Acids, etc. L. L. Van Slyke and E. B. Hart.

A Gastrointestinal Type of Measles.—During an epidemic of measles at Tours, Gillard (*Lyon Medical*, April 23, 1905) observed that 18 out of 25 patients seen by him presented gastrointestinal symptoms as their predominant manifestations. These symptoms consisted of a bilious diarrhea, the stools being greenish and of extremely fetid odor, often accompanied by a bilious vomiting also. These phenomena appeared usually about the second or third day of the eruption, although they may be delayed much later. In some cases they seem to cause a slight fall in temperature. Eight of the cases were very grave, and four terminated fatally. These cases presented a typhoid state—prostration, brown furred tongue, delirium, etc. Six of these 8 cases were complicated by bronchopneumonia.—*American Medicine*.

A NEW SIPHON ASPIRATOR.*

BY FRANCIS HUBER, M.D.,

New York.

Pleural effusions not amenable to medical treatment may be removed by means of the trocar and cannula, siphonage, aspiration or incision.

The last named method is applicable to purulent processes, and only in exceptional cases to serous exudations of long-standing. The trocar and cannula have been abandoned because of obvious disadvantages (size, danger of hemorrhage, or wounding lung, leaving a permanent fistula and admitting air into the pleural cavity with danger of secondary infection).

The valuable experiments and writings of Wyman and H. I. Bowditch have firmly established aspiration upon a scientific basis and laid the foundation of the aspiratory treatment of pleural effusions. Various types and modifications of instruments have been devised for the purpose of performing thoracentesis.

The different varieties of aspirators work upon the same principle—the close operation and the withdrawal of fluid by aspiration. The use of needles of small calibre (with or without protected points) and gentle suction obviate any danger and prevent the entrance of air to the pleural sac.

The “Dieulafoy” is unquestionably the best apparatus of its class. It is, however, expensive, heavy and inconvenient to carry. The “Potain,” though cheaper, is also bulky and, moreover, requires considerable muscular effort to establish the necessary vacuum in the bottle.

Dr. Connell proposes to do away with the pump altogether in the “Heat Vacuum Aspirator,” described in the *Medical Record*, July 4, 1903.

A few words regarding the siphon method (so called). The appliances (to be described below) are simple, convenient and inexpensive. The fluid escapes slowly, allowing the lung to expand gently, the neighboring displaced organs gradually resuming their normal position, thus avoiding the dangers incidental to a too rapid removal of the fluid. The cannula employed is somewhat larger than the aspirating needle. It should have two outlets, one straight, for the trocar, and one at an angle, for the attachment of from 1 to 3 feet of rubber tubing. A “T” may be inserted into the

* Read before the Elizabeth Annual Meeting of the American Pediatric Society, May 31, 1906.

siphon tubing and connected with a mercurial manometer to determine the exact degree of intrathoracic pressure if desired.

An aspirating needle or Fitch dome trocar attached to a rubber tube of the required length, thus doing away with the trocar, is simpler and answers equally well. Though it is advised to place the distal end of the tubing in a vessel containing sterile water, in order to avoid the sucking in of the air into the chest, there does not appear to be much danger of such accident, for the pleural fluid escapes under great pressure as soon as the needle or trocar penetrates the thoracic walls.

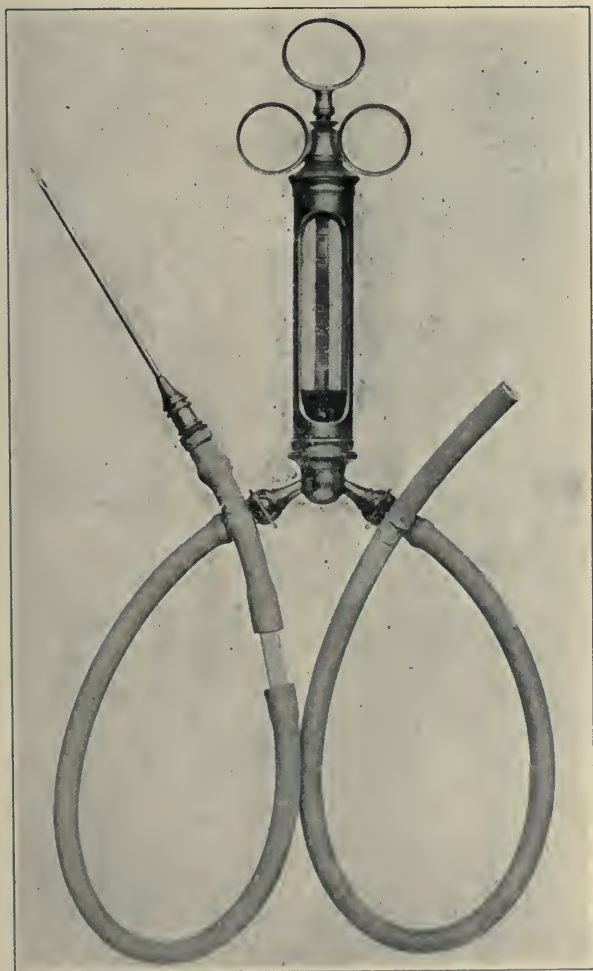
In the *Lancet*, March 25, 1905, West strongly advocates the removal of serous effusions by siphonage. The apparatus, as described in his paper, consists of an ordinary trocar and cannula connected with a rubber tube reaching to the floor. He advises that the mouth of the tube should be placed in a vessel filled with sterile water, in order to avoid the accidental admission of air into the chest during the operation. As soon as the needle has entered the chest and the trocar is withdrawn the fluid flows into the tube and fills it, thus forming a siphon by which the effusion is drawn off under a constant negative pressure of 15-24 inches of water—that is to say, of the height of the column reaching from the seat of puncture to the vessel on the ground. In this way the fluid is removed slowly under a steady constant pressure, the lung expanding gradually as the fluid flows away. The method is simple, inexpensive, effective and, moreover, safe; there is no doubt of that.

It cannot, however, be properly termed siphonage. If an ordinary aspirating needle is introduced into the chest filled with fluid, the latter escapes in jets corresponding to the respiratory acts. If a tube is attached to the needle, the flow is not so intermittent, but more or less continuous and free, depending upon the bore of the needle, the length of the elastic tube and the intrathoracic pressure. The principal factor which favors the escape of the fluid is the expansive power of the compressed lung forcing the fluid out through the needle and tubing. The term siphonage is therefore a misnomer.

The principle of the siphon is not employed in this case any more than it is in the siphon bottles containing carbonated waters. In the latter the discharge of fluid is occasioned by the pressure of gas; in the case of pleural effusions the force is supplied by the expansile power of the lung, which comes into play as the fluid escapes from the thoracic cavity.

In case the canula becomes obstructed, lowering the basin suddenly will probably remove the piece of fibrin, or the trocar may be introduced to remove the obstruction. A syringe may be used and a sterile solution injected or we may attempt to remove the plug by gentle suction.

In old or chronic cases, where the lung is firmly com-



SIPHON ASPIRATOR.

The entire apparatus weighs about 12 ounces. The dimensions of case are about $7\frac{3}{8} \times 1\frac{3}{8} \times 3\frac{3}{8}$ inches. To Mr. F. Eissner, surgical instrument maker, No. 18 Bible House, New York, my thanks are due for courtesies extended in working out the mechanical details, etc.

pressed or is bound down by adhesions, this method will not answer—as the *vis a tergo*, the ability of the lung to expand when the pressure is taken off, is absent.

For more than twenty years it has been the practice of the writer to use the “Dieulafoy” as a means to siphon (?) the fluid from the pleural cavity in the following way: After the needle has been inserted, 2 or 3 ounces are slowly drawn off in the

usual manner and allowed to remain in the glass barrel. The outflow cock is now opened, a steady flow is established at once, the *vis a tergo* being supplied by the expanding lung. The apparatus, it is understood, must be on a lower plane than the chest. The serous or seropurulent fluid escapes without the necessity of any further manipulation. This application of the large “Dieulafoy” leads to the idea of the smaller, simple and inexpensive contrivance shown in the photograph on page 15.



A detailed description is not essential, as the main features are distinctly shown in the illustration. An ordinary aspirating or exploring syringe, about $3\frac{1}{4}$ inches in length, holding about $\frac{1}{2}$ ounce (the lower fitting replaced by a cap provided with two stopcocks)

is employed as a substitute in place of the elaborate glass cylinder with the rack and pinion action of the “Dieulafoy” apparatus.

The syringe may be used for the purpose of causing the flow to commence. An equally efficient and preferable method is to fill the tube and barrel with a sterile solution, the distal stop being closed. The chest is then tapped, and as soon as the outflow tap is opened the fluid escapes without any trouble, provided the apparatus is below the level of the effusion in the thorax.

A cardinal point to remember, and this applies to any aspirator, is the following: Be certain that the instrument is in good order, the needle pervious, the syringe and stops working easily and without leakage before the operation is attempted.

The needle, tubing and syringe, all properly sterilized, are filled with a warm sterile solution to ascertain if the instrument be in good working condition. If the test is satisfactory the distal stop is closed. The chest is then punctured, the syringe partly filled with fluid is on a lower level, resting on a sterile towel on the bed or table, air cannot be sucked up, and when the outflow stop is opened a more or less continuous flow occurs, the fluid flowing into a basin on the floor.

The writer has used the apparatus extensively in hospital practice and also in private. If the simple technique be carried out, there will be no disappointment in its employment.

Value of Milk Solids Poor and Rich in Fat.—C. L. Beach (*Sporr's Agricultural Experiment Station*, Bulletin 31, November, 1904) found that to produce one pound of gain in weight in calves, pigs and lambs, more total solids were required with milk rich in butter fat than with milk poor in fat. Serious digestive disturbances occurred in pigs fed large quantities of rich milk. The results were apparently due, not to lack of nitrogenous material, but to the excess of fat or the character of the fat. Larger fat globules were found in the richer milk; this, with the digestive disturbances, seems to indicate the reason for the larger gain from a pound of solids with the poorer milk. Fat globules in human milk are smaller than those in cow's milk; if it is safe to reason by analogy from the animal to the human, it appears that whole cow's milk containing a moderate per cent. of fat is better for infant feeding than is a whole milk high in fat content.—*American Medicine*.

Ovarian Tumors in Children.—Winternitz reports (*Jahrbuch für Kinderheilk*, Vol. LXIII., No. 3) 4 cases cured by operation. The tumor was an embryoma in all but one. Palpation of the tumor usually differentiated the ovarian growth, but appendicitis had been diagnosed in one instance. In this case a dermoid cyst of the ovary, after torsion of the pedicle, had suppurated and perforated through the abdominal wall.—*Journal of the American Medical Association*.

A CASE OF PARALYSIS OF THE ABDUCENT NERVE FOLLOWING INFLUENZA.*

BY ANNA S. WILNER, M.D.,
New York.

Ethel W., nine years old, had the ordinary symptoms of influenza, coryza, chilliness, and some muscular pain, lasting for about three days, but as the symptoms were slight no doctor was sent for. In a few days she again took sick with a croupy cough; as the cough became softer the next day and the child was subject to colds, not much attention was paid to it for another few days until February 12th, when her parents thought she looked sick, and the author was sent for. An examination then revealed a temperature of 103° F., pulse, 120, extensive bronchitis, with a few places of pulmonary congestion; the tongue was coated, bowels regular, throat clear, and child was up and around, but looked very sick. Under the ordinary treatment and rest the child began to improve, and the temperature was down to 100° F. in the evening of the third day. During the following night for a few hours the child complained bitterly of an earache until the ear began to discharge.

On the morning of the next day, February 15th, the temperature was 99° F.

February 16th, 10 A.M. Temperature 99° F., general condition remains good; ear discharging; cough continues.

February 17th, 10 A.M. Temperature 99° F., condition the same, but the patient had fever the previous afternoon, and an occasional sharp pain on the right side of the head. The patient was seen again in the afternoon, temperature 105° F., otherwise she did not seem any worse than in the morning; no tenderness in the mastoid; examination of chest revealed only bronchitis as before. For the next twenty-four hours the temperature was taken regularly every four hours, with the result that a perfect intermittent curve was elicited, 99° F. during the night and morning, and 104° F. again in the afternoon. Another most searching physical examination proved negative. The only two causes liable to bring about the fever seemed either defective drainage or malaria; as the ear *apparently* kept on discharging quite profusely, and there was no tenderness in the

* Read before the Section on Pediatrics of the New York Academy of Medicine, October 11, 1906.

mastoid region, the diagnosis leaned toward malaria, though the spleen was not enlarged. Owing to some misunderstanding, no blood examination was made, and on the strength of the temperature curve alone quinin was prescribed, but without any marked effect, as on the next day, February 19th, the fever went up to 103°F. during the afternoon. As the child seemed very much annoyed by the tinnitus aurium, and the quinin failed to reduce the temperature, it was discontinued. She still complained of pain on the right side of the head now and then. During the evening the discharge from the ear ceased for a few hours, the temperature, however, being only 99°F.

A consultation with an ear specialist, Dr. McKernon, was arranged for the next afternoon, and though on this day, for no apparent reason, the temperature remained about 99°F. and the ear continued to discharge, it was still thought best to enlarge the opening and so insure better drainage.

February 21st. General condition good, the temperature, however, going up to 102°F. late in the afternoon.

February 22d. The child is heavy and drowsy the entire day, takes food only when coaxed, and then rather unwillingly; takes no interest; answers questions with great reluctance, though rationally. The temperature is 99°F., pulse 90; the ear keeps on discharging. As the child seemed well every other way, and as there were no cerebral symptoms whatever, the possibility that the drowsiness was due to intestinal intoxication and exhaustion suggested itself, and calomel and salol were prescribed.

The next day the child developed internal strabismus of the right eye and a slow and irregular pulse. She remained prostrated, listless, apathetic and deeply somnolent, but answered questions rationally when roused; she still took very little nourishment and only upon being coaxed. Temperature 99°F., pulse irregular, varying from 90 to 60 through the day. On being roused and made to get out of bed, the child seemed a little dizzy, and walked across the room with a staggering gait.

A pediatricist was asked to see the child, and after examination suggested the diagnosis of either tubercular meningitis or cerebellar abscess. The symptoms which were especially laid stress upon, as pointing to the abscess, were the history of suppuration in the ear and headaches, and the presence of stupor and dizziness, and an immediate operation was urgently advised. The case, therefore, had to be relegated to a surgeon, preferably aural, and

Dr. Gruening was asked to see the child. Dr. Gruening suggested that the condition might be due either to serous meningitis or perhaps merely to toxemia caused by the influenza poison, and strongly advocated the expectant plan of treatment. The dizziness was explained by the changes in the child's vision consequent to the paralysis of one of the muscles, and as a matter of fact, when the affected eye was blindfolded the child was no longer dizzy.

The next day the child was very much brighter, remained awake most of the day, and asked for something to eat; temperature was 99°F., pulse 90 and regular, strabismus continued. From then on the general condition began to improve, the paralysis remained stationary for several weeks, when it too commenced to be less and less marked, and by the 15th of May, that is, after three months' duration, it finally disappeared.

From the history of the initial attack of coryza, chilliness and muscular pain, and from the occurrence of a more severe relapse, accompanied by marked prostration, bronchitis, fever and otitis media, the diagnosis of influenza was arrived at, for the above clinical data are regarded as sufficient proof of this disease, even though no bacteriological examination be made to demonstrate the Pfeiffer's bacillus. The intermittent curve of the temperature, which would at first glance suggest malaria, was evidently one of the irregular and erratic curves which the fever of influenza, with its complications, so often exhibits; for the failure of the therapeutic test and the absence of the enlarged spleen preclude the presence of malaria. And again the appearance of the nervous disturbances during convalescence might point to diphtheria, which even in its mild form may be followed by the nervous phenomena; in this case, however, diphtheria was positively excluded by the absence of Klebs-Löffler bacillus in the cultures taken from the throat, nose and ear.

On looking over the literature of influenza one becomes rather impressed with the frequency with which the nervous system is affected by the microorganisms of influenza and their toxins. Lichtenstern,¹ who studied the subject very exhaustively, believes that in frequency of occurrence, the complications of the nervous system are second to those of the respiratory system. While there are infections, as diphtheria, typhoid, malaria and others, that may be followed by nervous disturbances, none

of these, and not even all combined, are liable to cause the affections which influenza alone can either bring about or stir up. It seems that the only other poison which can play such havoc in the human body is syphilis. The nervous manifestations of influenza are similar to those of diphtheria, in so far as they are both toxic; but, as influenza is a bacteriemia as well as a toxemia, it may produce not only toxic or degenerative changes, but also inflammatory and purulent manifestations. And again, while the nervous disturbances of diphtheria are more or less constant in their character, those of influenza are most erratic as to the time of onset and the part affected; in fact, any inflammatory, degenerative or functional disease of the brain, spinal cord, nerves and the vasomotor system may in some way or other be brought about by influenza.

Such a strong and almost exclusive hold do the microorganisms and the toxins of influenza exercise upon the nervous system, that various writers have advanced the theory that influenza is mainly a nervous fever affecting the respiratory and alimentary systems through their nervous centres. Heindricks,² describing the pandemic of 1830, said that influenza was an affection of the nervous ganglia, with an irritation of the mucous membranes; Lichtenstern, that it was a severe nervous poison, inciting inflammatory and degenerative changes, especially in the peripheral nerves; Sell³ called it an infectious neurasthenia; Smitz⁴ an epidemic nervous disease, and Draper⁵ said that the cause of the disease is one which spends its force principally upon the nervous system, and that relapses, both more serious in nature and accompanied by more severe lesions than the original attack, are liable to occur.

The effect of the influenza microorganisms and their toxins upon the nervous system is very manifold, and Dr. Mix's⁶ suggestion of classifying the different nervous disturbances is most practical. With the time of onset as the basis of classification he divides all the nervous complications into five groups:

1. The complications of the prodromal state, as headache, neuralgia, delirium, and coma, all of toxic origin.

2. Those arising during the height or the decline of the disease, as inflammation of the brain, spinal cord and their meninges, which may be either toxic and degenerative or inflammatory and purulent.

3. Those of the period of convalescence, as functional neu-

ralgias and myalgias, and organic neuritis, either multiple or focal, which likewise are only toxic in their nature. To this group may be added the various nervous disturbances of the vasomotor system.

4. Those of the postgrippal period, as epilepsy, neurasthenia, hysteria, and all the other known motor and sensory disturbances of the nervous system. They are also of toxic origin and are often only stirred up from their latent state by the influenza toxemia.

5. Those comprising all the psychoses from a simple mania to insanity which, though they may appear at any stage of the disease, are more likely to come during convalescence; these disturbances are very often ascribed to an acquired or inherited neuropsychopathic tendency and are considered merely as aroused by the influenza toxemia. Lichtenstern, however, insists that he has seen cases where there have been no such tendencies whatever, and the condition was entirely due to influenza.

The paralysis of the external rectus muscle in the case of Ethel W. evidently belongs to the third group, namely, the complications of the convalescent period under which focal neuritis is classified. Owing to the generally favorable outcome, which limits the observations and conclusions to clinical data only, the pathology of these cases of neuritis is quite obscure, and it is impossible to determine whether the lesion is in the cerebral nuclei or in the axones leading from the nuclei. In the paralysis of the cranial nerves especially, the line of demarcation is so sharp that it has been suggested that the toxic effect is exerted, not upon the axones, but upon the cell body. Though nuclear in nature, this disturbance is considered peripheral, as the effect is exerted upon the lower or peripheral neurons. It has also been suggested that, because of the mildness of the symptoms, and of the generally favorable outcome, the effect of the toxins on the nerves may be only functional, modifying the functions and not the structure of the cell. Althaus⁷ believed that the part of the nervous system most frequently affected was the bulb.

While any of the functional or organic diseases of the entire nervous system may directly or indirectly be caused by influenza, sudden death even being known to have occurred from a paralysis of either the respiratory⁸ or the heart muscles, there seems to be a predilection on the part of the poison for the different cranial nerves. Numerous cases of paralysis of one or more of the eye

muscles have been reported, the internal rectus muscle of either one or both eyes being the most commonly affected. Cases of paralysis of the entire motor oculi or both external recti muscles are much less frequent, but are apt to end rather gravely. Even cases of optic neuritis and iritis⁹ cataract and glaucoma¹⁰ have been met with. The disturbance of the other cranial nerves has also been repeatedly observed in the loss of taste,¹¹ smell,¹¹ voice¹² and speech,¹³ and in the paralysis of the soft palate, pharynx and face.¹⁴

Referring again to the case of Ethel W., it seems the paralysis of the sixth nerve was not the only point affected by toxemia, as there was the sudden appearance of the slow and irregular pulse. Similar cardiac disturbances were mentioned by Huchard¹⁵ in connection with influenza toxemia and spoken of as "*le pouls instable*," or the so-called poikilorhythmia. Because of their abruptness the changes in the pulse rate and rhythm are inferred to be due to a toxic and functional neurosis of the cardiac fibres of the pneumogastric nerve.

Still another point of interest was the sleepiness, which lasted for forty-eight hours. This condition has also been known as a symptom of influenza and has been spoken of in the description of the epidemic of influenza in Tübingen in 1712, and by Hoffman,¹⁶ who calls attention to the morbid somnolence of la grippe. The drowsiness is thought to be due to the direct action of the microbes. It usually is accompanied by high fever and appears early in the disease.

REFERENCES.

1. Nothnagel's Encyclopedia.
2. Quoted by J. M. Mosher, *Medical News*, New York, 1900, Vol. LXXVII., p. 924.
- 3, 4, 5. Quoted by Dr. J. M. Mosher.
6. *Medicine*, Detroit, Michigan, 1904.
7. *Lancet*, 1892, February 13, p. 387; and 1895, April 13, p. 948.
8. Burry, Judson. *British Medical Journal*, 1900, Vol. II., p. 877.
9. Gallemaerts. *La Polyclinique*, Brux., 1903, Vol. XII., p. 241.
10. Cosse, F. *Ann. Méd. Chir. de centre Tours*, 1903, Vol. III., p. 132.
11. Lichtenstern. *Nothnagel's Encyclopedia*.
12. Casteux de Paris. *Bull. de Laryng., Otol. and Rhinol.*, Paris, 1905, Vol. III., p. 209.
13. Pope, Curran. *Charlotte (N. C.) Medical Journal*, 1905, Vol. XXVI., p. 376.
14. Vallude. *Berlin. Klin. Wochenschrift*, 1892, p. 893.
15. Mix, Ch. L. *Medicine*, Detroit, Michigan, 1904, p. 335.
16. Quoted by J. Hallé. *Presse Méd.*, Paris, 1903, Vol. I., p. 336.

A CASE OF SEPTIC ENDOCARDITIS WITH RECOVERY.*

BY WILLIAM COWPE GARDNER, M.D.,
New York City.

The reputation of endocarditis is such that one reports a case of recovery with considerable diffidence. There is a widespread belief that the only result is death, and that the only reliable diagnosis is made after death. A recovery, therefore, flatly contradicts this prognosis and makes this very reliable method of diagnosis impossible. Nevertheless, it is advisable to report such cases as a protest against the prevailing pessimism, even if they are not supported by absolute proof. For, as the soldier cannot fight well in a hopeless battle, neither can the physician do his best work in a hopeless disease.

Septic endocarditis, in the vast majority of instances, is a secondary disease. It occurs with pneumonia, rheumatism, gonorrhea, puerperal sepsis, scarlatina, smallpox, erysipelas, typhoid fever, influenza, measles and probably other diseases. The infecting germ may be pneumococcus, gonococcus, staphylococcus pyogenes aureus, streptococcus pyogenes, bacillus pyocyaneus and others.

The morbid anatomy is that of simple endocarditis with the septic feature added; the endocardial vegetations containing the infecting germ and the diseased tissue often undergoing necrosis and ulceration. Septic emboli are common, occurring most frequently in the spleen and kidneys.

The prognosis is always grave, and it is sometimes said that recovery means a mistake in diagnosis. The lowest mortality estimate that I have seen is 80 per cent. It is more commonly considered very little below 100 per cent. And yet quite a number of recoveries have been reported. Herrick¹ gives the history of a

*Read before the Section on Pediatrics, New York Academy of Medicine, October 11, 1906.

personal case and enumerates 20 gathered from literature; in 2 of these positive cultures of the infecting germ were obtained from the blood. In 19 cases cited by Ogle², which were treated with antistreptococcic serum, there were 6 recoveries, in 2 of which the blood cultures were positive. Sir Dyce Duckworth³ reports a personal case of recovery treated with yeast and antistreptococcic serum. No blood culture was made. Such reports as these show that septic endocarditis is not hopeless. Furthermore, a consideration of the variations that may occur in some of the chief factors of the disease would lead one to believe that there must be considerable variation in the results. The resisting power of the patient, as in all diseases, may be of almost any degree; the primary disease may be a serious one, like pneumonia or puerperal sepsis, or a relatively mild one, like measles, and, as we know, each disease may vary much in duration and severity; then the infecting germ may be one of several kinds which differ in toxic power, and each one of which may show marked variations in virulence. Thayer,⁴ in reporting a case of proven gonorrheal septicemia, in which a cardiac murmur developed, but disappeared after recovery, says:—"If an endocarditis was present it must have been of so slight a degree as to leave no appreciable permanent damage." As the gonococcus can act upon other membranes without leaving any appreciable permanent damage, it is not unreasonable to suppose that it may so act upon the endocardium. It would seem, then, that in septic endocarditis, the varying elements and the variations possible in each element would argue strongly for the occurrence of mild cases and recoveries. The fact that such recoveries are not more commonly reported is probably due to the difficulty of diagnosis. As it is not very uncommon in fatal cases for the disease to be discovered first at the postmortem examination, one can readily understand that in cases which recover it might escape recognition altogether. Postmortem records alone give too one-sided a view for us to base mortality rates upon them. They may show both our successes and failures in diagnosis, but they practically show only our failures in treatment.

The diagnosis of septic endocarditis is often extremely difficult and at times impossible. This is not surprising in a disease that has no distinct and definite clinical picture. The symptoms may be masked by those of the primary disease, or obscured by a pre-

existing endocarditis. Furthermore, cases are recorded in which there was no cardiac murmur and 1 case in which there was no pyrexia.

Lenhartz⁵ considers that when a heart murmur is present and the general symptoms suggest a septic disease, the presence of an enlarged spleen confirms the diagnosis, but the most important evidence is to be obtained by the examination of the blood for bacteria. A positive culture from the blood, however, is not always to be secured. Glynn⁶ states that his experience coincides with that of others who have occasionally obtained a negative result, even when several cubic centimetres of blood have been removed from a vein. Cabot⁷ writes:—"Sometimes pyogenic cocci can be cultivated from the blood and, if present, may be of the greatest value in a diagnosis always difficult to make." According to Elsner,⁸ *repeated* negative results of cultures of the blood make the presence of malignant endocarditis unlikely. We may combine all these by saying that while a positive culture strongly supports the diagnosis, a negative result does not disprove it.

The case I have to present to you is as follows:—

M. C., a boy, five and one-half years of age. Has always been pale, thin and somewhat undersized. He has had whooping-cough, measles and scarlet fever. Father healthy—has suffered from rheumatism. Mother of nervous temperament, but fairly good health. His sister and five brothers are all healthy.

I was called to the patient March 27, 1904, and learned that he had been feverish and restless during the night previous. Temperature 102°, and tongue heavily coated. Physical examination was negative. Gave calomel, gr. i., in divided doses.

28th. Had vomited during the night and now has abdominal pain, but no tenderness. Temperature 101°, pulse 100.

29th. Had passed another restless night. He now has marked opisthotonos. There has been no vomiting nor headache; no strabismus; and pupillary reactions are normal; heart, lungs and spleen normal. Temperature 100°, pulse 120. I asked for a consultation, and at 5 P.M. Dr. A. Jacobi saw the case with me. He believed the opisthotonos to be due to rheumatism of the dorsal muscles and advised aspirin, gr. v., q. two hours.

30th. Temperature did not go above 100°, but pulse ran up to 160. Gave spartein sulph., gr. $\frac{1}{6}$, q. four hours, and aspirin, q. four hours. The urine contains a small amount of albumin.

31st. Little change in condition. Urine free from albumin.

April 1st. The left knee is very painful and tender, but there is no swelling nor redness. This continued several days. The rigidity of the back is about the same. During this and next three days temperature varied from $99\frac{2}{3}^{\circ}$ to $100\frac{3}{8}^{\circ}$.

April 4th. Slightly lessened rigidity in the back.

5th. In the early morning he complained of severe frontal headache, and the temperature rose rapidly until at 9 A.M. it was $104\frac{2}{3}^{\circ}$, pulse 134. Left knee is still painful, but the back less rigid. A systolic murmur can now be heard over the entire cardiac area—with the greatest intensity at second right interspace. At 6 P.M. temperature was $102\frac{4}{5}^{\circ}$.

6th. Has had nosebleed in the morning and headache all day. Temperature kept near 102° .

7th. At 11 A.M. temperature $104\frac{2}{3}^{\circ}$, and at 5 P.M. $98\frac{2}{3}^{\circ}$.

8th. 8 A.M. temperature was normal, and at 1 P.M. temperature $104\frac{3}{8}^{\circ}$; at 7 P.M. temperature $103\frac{4}{5}^{\circ}$. There is marked tenderness over the spleen, so much so that I cannot tell whether it is enlarged or not. I now regarded the case as septic endocarditis.

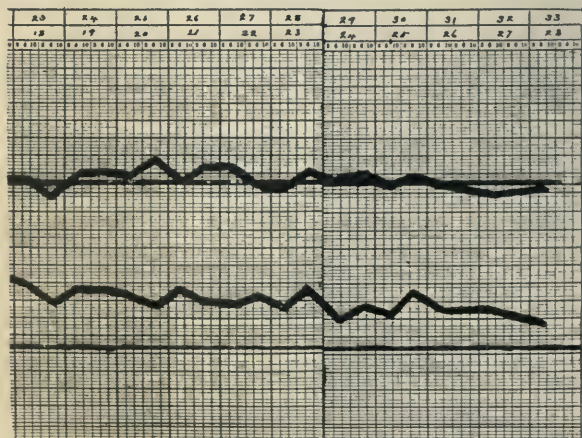
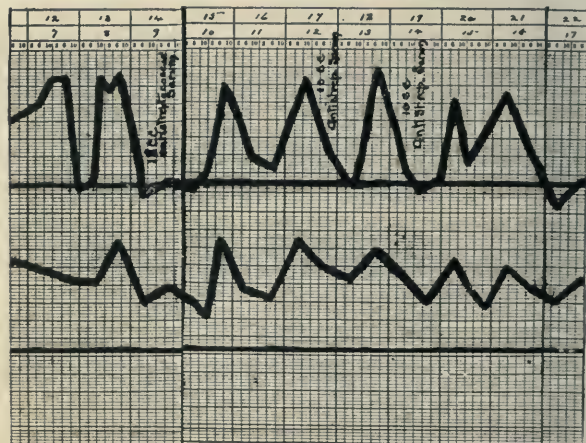
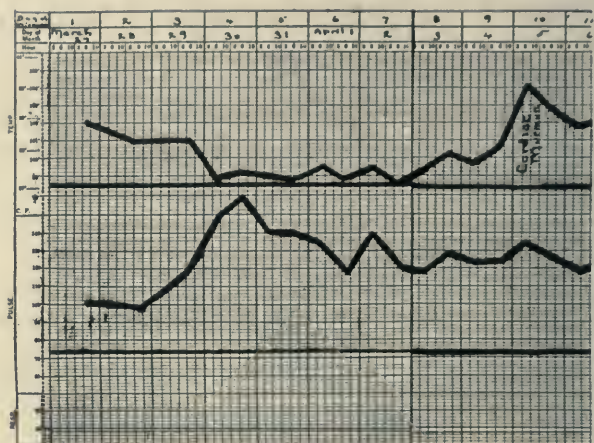
9th. Patient seems quite bright, and temperature did not go above 99° . Dr. Jacobi saw the case with me again and agreed with the diagnosis of septic endocarditis. It was decided to inject antistreptococcic serum and to give inunction of Ung. Credé, gr. xx., morning and evening. At 9 P.M. injected 10 c.c. serum into tissues of the abdominal wall.

10th. In the morning temperature was nearly normal. At 4 P.M. the premonitory headache came on, his temperature being $99\frac{1}{2}^{\circ}$. At 7 P.M. temperature $104\frac{2}{3}^{\circ}$. This came down quickly and during next day did not go above $99\frac{2}{3}^{\circ}$.

12th. At 4 A.M. he woke with headache and the temperature rose rapidly, being at 8 A.M. $104\frac{3}{8}^{\circ}$; at 7 P.M. temperature $100\frac{2}{3}^{\circ}$. Again injected 10 c.c. antistreptococcic serum.

13th. At 8 A.M. temperature $98\frac{2}{3}^{\circ}$. At 3 P.M. headache came on again, and at 7 P.M. he had temperature $104\frac{4}{5}^{\circ}$.

14th. Highest temperature, 99° . Seeing no result from the previous injections of serum, I sent directly to the manufacturers and asked for the most recent they had, and at 8 P.M. injected 10 c.c.



TEMPERATURE CHART.—CASE OF SEPTIC ENDOCARDITIS.

15th. 6 A.M. temperature $103\frac{2}{3}^{\circ}$; at 11 A.M. $99\frac{2}{3}^{\circ}$, and at 2 P.M. 98° . Premonitory headache was less severe than before.

16th. The temperature at 3 A.M. was $98\frac{4}{5}^{\circ}$; at 5 A.M. $103\frac{4}{5}^{\circ}$, and at 7 P.M. 100° .

17th. 8 A.M. temperature $97\frac{2}{5}^{\circ}$.

18th. 7 P.M. temperature $97\frac{4}{5}^{\circ}$; being near normal between these.

From this time forward the temperature ranged between 98° and $99\frac{4}{5}^{\circ}$.

19th. The heart murmur sounds fainter.

20th. Ung. Credé inunctions reduced to grs. xx. a day.

The first and third injections of serum were made into the abdominal wall to the right of the median line. To-day (*i.e.*, six days after the last injection) the right inguinal glands are enlarged and tender. There are also several pale, pea-sized elevated spots on right abdominal wall.

21st. The elevated spots and swelling of the inguinal glands almost disappeared, but the right side of abdomen is thickly covered with small purpuric spots about size of a pin-head.

On April 28th the patient sat up. At that time there was a faint systolic murmur heard at the second left interspace.

I examined the heart on May 21st and could discover no murmur.

I am fully aware, I think, of the flaws in my case. The septicemia is not proven, as there was no culture made from the blood; the endocarditis is not proven, as the murmur did not persist; and the septic endocarditis remains unproven, because the patient did not die. But this is the negative and theoretical side of the case. On the positive and practical side, we have a desperately sick child with a septic temperature, a recently developed cardiac murmur and a markedly tender spleen. Looking at such a group of symptoms in a medical meeting is one thing and at the bedside quite another. Here we criticise the fully developed case, but there we must act while it is developing; here it is a leisurely debate, there it is a pitched battle. As I present the case to you this evening the diagnosis may be doubted, but should a patient present an exactly similar picture to you to-morrow, I am inclined to think that the diagnosis and treatment would be that of septic endocarditis. If this be true, I trust that this report may suggest that in such cases antistreptococcic serum and Ung. Credé are

sometimes of great value in saving life. (The discussion of this paper will be found on page 51.)

REFERENCES.

1. Medical News, September 6, 1902.
 2. Lancet, March 14, 1903.
 3. British Medical Journal, May 23, 1903.
 4. American Journal of Medical Sciences, November, 1905.
 5. Münch. Med. Woch., July 9 and 16, 1901.
 6. Lancet, April 11, 1903.
 7. Cabot. "Clinical Examination of the Blood." Fourth Edition.
 8. Medical News, May 9, 1903.
-

Celluloid Intubation Tubes.—Reich (*Münchener Med. Woch.*, June 27, 1905) has made use of celluloid tubes for intubation purposes. They are light in weight, present a perfectly smooth exterior and interior, are elastic, less likely to produce pressure necrosis, and permit of a large lumen with the thinnest possible wall consistent with strength and firmness. They are disinfected readily by washing in running water and immersion, for a short time, in a weak carbolic acid solution.—*Journal of the American Medical Association.*

Gualasanol Against Oxyuris Vermicularis.—A. Rahn (*Münchener med. Woch.*, 1905, Vol. LII., No. 16, p. 783) has found guaiasanol very effective against the oxyuris vermicularis, its employment simple, and its effect lasting. Guaiasanol is diethylglycocol guaiacol; it is easily soluble in water, has a penetrating odor and taste, but is absolutely harmless for the mucous membranes, having been employed by the author even in cleansing of the nasal cavity. He employs it in the following manner: The rectum is cleansed with a lukewarm soap enema (150 cc. in adults, 75 cc. in children); this is followed by the same quantity of guaiasanol solution (4 per cent. to 5 per cent. in adults, 2 per cent. to 3 per cent. in children); it is retained in the rectum for about five minutes, the patient lying on his left side; this is repeated during three successive evenings. It sufficed to kill all the worms in every case in which the method was employed.—*American Medicine.*

TREATMENT OF SCARLET FEVER.*

BY I. L. POLOZKER, M.D.,
Detroit, Mich.

The treatment of this disease, as in all the exanthemata, is divided into the prophylactic and the medicinal. In this paper I can treat but briefly of each, space and time not permitting me to enter into details. A book could be written on either one of the two divisions of the question.

In prophylaxis, as soon as scarlet fever is suspected, the patient should be isolated and a competent nurse placed in charge. A large airy room, remote from the rest of the house should be selected. It should be devoid of all carpets and tapestries—indeed, of all unnecessary furnishings. The nurse in charge should stay constantly with the patient and not come in contact with the rest of the household. If these precautions are not possible in the home of the patient, recourse should be had to a hospital.

Even where isolation, either in the house or the hospital, is accomplished the possibility is never to be lost sight of that some other child in the family has already been infected. The first symptoms of the disease occur in the invasion period, and perhaps there were other children in contact with the patient during the incubation period. Thus it is necessary to watch them all and to isolate all the children that have been exposed.

The doctor ought to trace the infection in all cases, and, if possible, determine whence it came. By careful search it will almost always be traced to the school which the affected child attends, or to some other source of infection, as you all know from the etiology.

Then the physician himself is often a cause of infection. One can see every day a physician walking into and out of a house where scarlet fever exists and never taking any precautions. In hospitals a careless interne will go from the contagious diseases wings into other parts of the institution, meeting friends or coming in contact with non-infected patients, and so spread the contagion. How can it be expected that the public at large will respect and observe the laws of the Health Board with such examples before them? A physician's visit to a scarlet fever patient should be his first visit of the day and timed so that he can go back home and change his clothing and disinfect himself; or this should

* Read before the Medical Section of Wayne County Medical Society, Detroit, October 8, 1906.

be the last patient visited that day so that he can make the change. He should carry a gown that will cover him from head to foot. When he makes his call he can put it on before he sees the patient. He should always wash his hands in an antiseptic solution before leaving.

After a scarlet fever patient is discharged he should not be allowed to mingle with other children. To say when the child should go back to school is a very important question and one not easy to decide. I would rather be guilty of erring in the direction of keeping the child away from school longer than may be exactly necessary than to commit the other error of permitting him to mingle too soon with other children. We all know the treacherously infectious capacity of scarlet fever, the disease being communicated often years later through some article of clothing worn by the patient, or even by some toy handled by him. The matter of the child's attendance at school, however, is really important, and at the risk of appearing radical in my beliefs I will state an idea that I have with regard to this matter. It is, that it might be a good plan to send all such convalescents to some school set apart for the purpose, where for a couple of months they would receive their schooling and would not come in contact with children other than those that had passed through the disease and become immune.

In the home from which the scarlet fever patient has been discharged, all playthings used in the sick-room, and all books, clothing, etc., should be burned. The house itself should be thoroughly disinfected and the walls repapered or painted if possible.

Medical treatment in an ordinary case of scarlet fever—when there are no complications—is nothing. Attend to the nourishment, and so keep up the patient's strength. Keep the patient in bed—and especially is this necessary while the child has a rise of temperature. A fluid diet should be given and strict attention paid to all the secretions and excretions. The bowels and the urine should be watched. A little diuretic and a laxative should be given. Something like citrate of magnesia will act as both.

The urine should always be examined. A graduated vessel should be furnished the mother or nurse, and the amount of urine passed carefully measured. And on examination, if albumin is found, look for casts. A twenty-four hour quantitative and qualitative analysis should be made. Blood is often found in quantities very apparent to the naked eye. Sometimes the edema comes on

before the change in the urine. Sweating, and a milk diet, will be beneficial, and if blood continues to be found in the urine, adrenalin can be used; it has worked wonders in my hands. Two to five drops of a $\frac{1}{1000}$ solution every two or three hours has in twenty-four hours cleared away the blood.

When the child is recovering from scarlatinal nephritis it should be watched carefully, and the urine examined very often for some time. Of the several cases that I have had, I only know of one—a little boy, five years old—who had a bad form of scarlatinal nephritis and recovered. After persistent albumin in the urine for one and a half years it finally disappeared, and has not been seen for the last six months. Frequent examinations are being made by the father, who is a physician. The only case I know of personally in which the child was not left with a permanent nephritis was this one, and I cannot speak with certainty about his future. Any acute affection is liable to set up sub-acute nephritis in this child. When one thinks about the danger of letting a child grow up with a nephritis, especially a young woman, her life endangered during pregnancy, cases which every practitioner sees, one cannot but believe that the physician should think of these things, should think of the future. He should not rest until he has done his best to prevent this complication in later life. The physician of to-day is the man who does these things, who looks out for the future of the child and does more than prescribe remedies, drugs or foods in cases of disease where the organs of digestion and secretion are not able to take care of them, and so may bring on nephritis by his treatment. In such cases try to relieve the kidneys and make the bowels, skin and other organs perform part of their work.

Attention should also be given to the nasopharyngeal toilet. The nose and throat should be washed out with a normal saline solution. This nasopharyngeal toilet is never omitted by me, no matter how mild the case may be. I like to use a medium size ear syringe of one piece of soft rubber, holding about 2 ounces for the nasopharyngeal douche. There is nothing for the child to bite or break and cause alarm in the nurse or mother. A pint of warm water and a half to a teaspoonful of salt is all that is necessary. Sometimes a little alkali or some aromatic can be added. This solution is slowly injected, the child lying on its side, and if it happens to swallow a little of it there is no harm done.

Some talk about driving the fluid through the eustachian tube and causing an otitis; but there is little danger if proper precautions are taken. Just as soon as the ear shows any tendency to inflammation, the temperature keeps up. Wash out the ear with some antiseptic, and, if indicated, a paracentesis should be performed at once. Any glands in the neck going on to suppuration should be operated upon, but not before, as very large glands in the neck, as long as there is no rise of temperature and no signs of suppuration, should be left alone. I have seen some large ones disappear in course of time without any treatment.

In case the lymph glands are infected from the nasopharynx, apply early an ice collar. This stops the inflammation and retards the formation of pus. Cold applications, however, should not be kept up for too long a period, nor be applied when it is too late. Moist heat is better in the later period. This will hasten suppuration. Then the glands should be opened and treated surgically.

Coming now to a consideration of the uses of the bath in scarlet fever cases, a sponge bath or a full tepid bath is all that is necessary. But if the temperature is high, administer a cold bath to allay restlessness and bring down the temperature. Internal remedies for reducing the temperature in scarlet fever should not be given, because of the cardiac weakness already existing in this disease. The cold bath should be used if the rectal temperature is 103° or 104° F. The temperature of the bath should be about 68° or 70° F., and this can even be reduced in older children, but the duration should be brief and the patient thoroughly dried and put to bed. Lukewarm baths should be given if the temperature is not so high, or if the child is in a stupor or in a convulsion. Hyperpyrexia is best treated in this way. The cold bath stimulates the heart and the nervous system, making circulation better, the number of beats falls with the cooling, the intervals between the beats are longer and the heart can do better work. The better the circulation the better the organism can throw off its toxins.

Some believe that cold baths in scarlet fever will tend to cause nephritis. Leichtenstern, the most careful observer on this point, says: "My statistics, based upon a very large supply of material, justifies me in the conclusion that the cold water treatment in scarlet fever markedly diminishes the tendency to nephritis, rather than increases it."

When complications arise in scarlet fever cases a lot of trouble is experienced. We have all met with severe angina, cases where the throat is so choked that the child cannot breathe, where the glands of the neck are swollen; or there is a very severe scarlet fever nephritis; or a severe otitis; or a scarlet fever rheumatic knee. Then it is a different question. Bacteriologists are agreed that if scarlet fever is not due to streptococci, its complications are. They have isolated this germ from the urine, from the throat and nasal discharges, and even from the ear discharges; the profession agrees now that if not the disease itself, its complications are due to streptococci.

Baginsky states (*Deutsche med. Zeitung*, 1900) that "it is difficult after his experience to recede entirely from the position that scarlatina is due to streptococcus, and that the latter by no means represents a secondary infection following in the wake of some other germ disease."

Heubner, in the Berlin Medical Society, admitted the constant presence of streptococci, but was not satisfied with the results of animal experiment. Wassermann stated that Baginsky is correct.

Logically, it would seem that the antistreptococcus serum should be the remedy to use. I was rather skeptical about it. Good and bad reports had been given, and a good deal has been written upon the use of antistreptococcus serum. While I was in Vienna last summer I asked Professors Escherich and Monti about their experiences with the serum in this disease. Professor Escherich, with a very wide experience with scarlet fever, told me that he had seen some very good results from the use of the serum; while Professor Monti, with just as much experience, said that it has no merit at all. And that is about the sort of answers I got from clinicians in this country.

Two years ago, however, I had a very severe case of scarlet fever, complicated by severe angina, the throat being covered by a membrane. I used the diphtheritic serum without making any culture, thinking that I certainly had a diphtheritic angina. But it was of no avail, and it looked to me for a little while as if I were going to lose the patient. A culture from the throat was reported by the health board bacteriologist to be streptococci. I immediately used one tube of antistreptococcus serum, and an examination six hours after the injection showed a marked improvement in the throat. The septic symptoms were subsiding, the temperature

dropped, the pulse got better, restlessness was less. I was pleased with the result and injected a second tube. The improvement continued, and the patient got well without any other complications. His brother came down with the same disease a few days later, and I used antistreptococcus serum as soon as his throat showed more than the ordinary angina associated with scarlatina. And since I have tried the serum in some of my worst cases, I have interested some of my colleagues in it, and my own observation and theirs seem to satisfy us that it is a great remedy in scarlet fever complications. With it you will not see any septic cases. I strongly advise its use as a preventive in no matter how mild a case. Severe complications will then not ensue. Two years' use of it has convinced me of this. Other serums have been used. Marmorek's serum was given a good trial, but results were disappointing. Blood serum of convalescents was tried by Roger, and he relates but one beneficial result where the serum of a convalescent patient was injected into the vein.

Of course, from what I have said above, I do not wish to be understood as claiming that it is possible to prevent renal complications altogether. Distinctly *no!* In some epidemics no matter what is done, nor how long the child is kept in bed and on a fluid diet and kept from all exposure, it will get nephritis. The renal inflammation is supposed to be due to some toxin of this disease circulating in the body; this in passing produces an irritative inflammation of the kidneys. For that reason the child should be made to pass very much diluted urine with lots of water, which will aid the kidneys, and in that way prevent inflammation. The warm baths, packs, rubbing, keeping the patient warm, sweating, making the skin active, should be employed to lessen the work of the kidneys. Often the hot bath should be followed by the pack. A bath, the temperature at 102° or 103° F., or even higher, raising its temperature gradually for half an hour or longer, is good; and then the child should be wrapped in a hot and wet linen sheet, covered with blankets and put in a warm bed, a cold cloth being applied to the head and kept there all the time. Then the child should be dried and rubbed well and a warm night robe put on. Hot air or steam baths, and baking apparatuses, the same as are used in rheumatism, are also advantageously used to produce diaphoresis. The diuretics usually do no good. Infusion of digitalis is about the best. Potassium acetate, diuretin and calo-

mel are also used, but the results are not encouraging in nephritis. Water or other fluids of any kind are just as good. Good daily excretions of urine and sweating are aimed at to prevent uremia.

When uremia does come with convulsions, free inhalation of chloroform, hot baths, chloral and blood-letting should be used; dropsical effusions should be left alone.

Bronchopneumonic complications are treated as in other cases. For joint swellings—immobilizing, quiet, warmth, sodium salicylate or sodium bicarbonate, oil of wintergreen, etc., are used as necessary.

To sum up, I would ask for:

First.—The more thorough isolation of the patient.

Second.—Isolation for a while of other members of the family that come in contact with the patient, especially children.

Third.—More care by the physicians and those who wait upon patients.

Fourth.—A more thorough disinfection of premises after discharging a patient with scarlet fever.

Fifth.—Early diagnosis and more careful watching by the physician in mild cases of scarlet fever.

Sixth.—The use of anti-streptococcus serum in all cases showing any tendency to be severe, or accompanied by any complications, especially angina.

Seventh.—The removal of hypertrophied or diseased tonsils and adenoids in children.

Eighth.—The frequent examination of urine in scarlatinal cases.

Ninth.—The continued care of the patient until all the desquamation is over and all complications are well; especially so with otitis.

Tenth.—Refusal of permission to go to school for the longest time possible consistent with education.

Eleventh.—The refusal of surgical and obstetrical cases by the physician attending many cases of exanthemata. The time will come when the exanthemata will be treated by a specialist only, a man that will confine himself to these cases.

Twelfth.—Constant efforts to enlighten the laity upon the dreadful results of this disease and its complications, and for more rigid health laws.

270 Woodward Avenue.

Clinical Memorandum.

GENERALIZED PIGMENTATION AND PALMAR KERATOSIS FOLLOWING THE USE OF FOWLER'S SOLUTION.

BY JACOB SOBEL, M.D.,
New York City.

It is not an uncommon occurrence for those with even moderate experience to note the appearance of different types of eruption after the introduction into the body of heterogeneous substances. Almost any one can record various antitoxin rashes, eruptions following vaccination, cutaneous manifestations due to hypodermoclysis and enteroclysis (erythema enemato-genese), and lastly, polymorphous outbreaks as the result of the ingestion of different drugs.

It may be well to remember that when the character of an eruption is in doubt and not in accord with the "clinical manifestations of ordinary eruptions" to inquire into the medication recently taken. We are all familiar with the very wide range of susceptibility or non-susceptibility which exists among patients, and while in one instance a dosage of half a grain of quinin may produce an extensive erythema with, perhaps, subsequent desquamation, another case may take from 600 to 1,000 grains of iodides during twenty-four hours without any suggestion of iodism. It is this so-called idiosyncrasy which we are compelled to take into consideration when prescribing drugs known to cause eruptions or other untoward effects; and yet unless a previous experience in that particular case has warned the patient or ourselves, we have no basis upon which to place reliance.

Most practitioners are alert to drug eruptions when they occur in the more common forms—erythematous, roseola, urticarial, papular or vesicular, but when unusual manifestations, such as pigmentation or keratosis, show themselves they become alarmed and turn their thoughts to other, and sometimes serious, possibilities. The following is a case in point:—Paul V., age six years and nine months, nephew of a physician, was referred to me on January 21, 1906, because of the possibility of Addison's disease. The boy, one of twins, was fairly well nourished, weighing 42 pounds; he had always been healthy, except for scarlatina at five years and measles at six. For some weeks the child had been pale and irritable and the doctor prescribed the necessary treatment and

subsequently Fowler's solution given as follows: First day, one drop three times daily, increasing by one drop daily until six drops were taken three times a day; then returning gradually to one drop three times daily and increasing again to six drops three times a day. When the boy reached five drops three times daily on his "second trip" the mother noticed the darkening of the skin, whereupon he was sent to me. In all, during a period of forty-seven days, some 453 drops of Fowler's solution were taken.

The mother stated that for the past two days she noticed that the boy was getting darker and that he had "dirty yellow spots on his neck which I cannot get rid of by washing, bathing or scrubbing with Hand Sapolio." In point of fact, his grandmother questioned whether his daily bath was not being discontinued. Examination of the patient showed his face to be of a yellowish brown tinge; the anterior and posterior surfaces of the neck presented a dark brown, irregular, dirty-looking discoloration; there was no scaling and no mahogany discoloration with Lugol's solution (Allen's test) such as occurs in pityriasis versicolor. The chest, abdomen, and back were stained light yellow-brown, of similar tint to the face; the axillary folds were dark brown with some eczematous scaling at points of contact, and the same obtained for the flexor surfaces of the elbows, knees and perianal region. The forearms were white and in distinct contrast to the pigmented areas. The upper surface of the penis and the scrotum were deeply pigmented. Inner sides of the thighs were dark brown and slightly scaly and bore a close resemblance to the axillary folds. The legs were light yellow; the palms and soles were free. The sclera was normal. The mucous membrane of the mouth showed no pigmentation. Urine was negative. Lungs normal. Heart normal except for hemic murmurs. Spleen and liver not palpable. Pulse strong and regular. Slight inguinal adenitis. No general adenopathy. No evidence of scratch marks. Malarial history negative. There had been no manifestations of gastroenteric irritability, nor had there been any edema of the lids or suffusion of the conjunctivæ.

With the expression of the diagnosis all arsenic was immediately discontinued and the patient was placed upon an iron tonic in the form of Ferro-Mannin, half a tablespoonful t.i.d. For the itchy and scaly areas in the axilla and flexor surfaces the following was given:—

R. Zinci oxidi, ʒss.; pulv. calamine, ʒii.; aquæ calcis, ʒii.; aquæ rosæ, qs. ʒvi., M: Sig. Apply twice daily.

January 28th. The itching has been relieved and the irritability was less marked. Both palms, however, were somewhat scaly, thickened and roughened. The extensor surfaces of the knees were also roughened. The soles of the feet were normal. The legs were somewhat darker and the forearms were light yellow. Olive oil was prescribed for the hands, to be applied before retiring.

February 3d. General condition improved. Hands have improved slightly. There was some fading in the front of the neck. All the apposed surfaces—axilla, flexors, groin and buttocks—were paler. The penis and scrotum showed retrogression of the pigmentation. Soles of the feet have remained free from involvement. The face showed much improvement, for over the nose, chin and forehead white spots have cropped out.

February 10th. General improvement continues. Appetite good. Face is paler. The axillary folds are losing their dark brown color. Neck is somewhat improved. There is less pigmentation in the perianal region and on the inner side of the thighs.

The left palm is very much improved, the right one is somewhat better, but the keratosis is still very evident. The body pigmentation is growing fainter. The following was prescribed for the palms:—

R. Acidi salicylici..... 1.0
Lanolini 8.0
Ungt. aquæ rosæ.....30.0

M: Sig. Apply twice daily.

February 17th. Left hand almost well. Right hand shows slight desquamation and superficial fissures. Keratotic condition gone. Face is getting progressively better. Back and front of neck are still faintly pigmented. Extensors of knees are slightly roughened; flexors are better. The back and abdomen are pigmented. *There is a furfuraceous desquamation of both legs.*

February 24th. Desquamation of legs has disappeared (salicylic ointment was used during the week). Roughness of knees is gone. Soles are free. Palms are normal except for a little greater prominence of the normal lines. Abdomen, chest and back are still light yellow and the neck is slightly pigmented. The face is practically free.

March 10th. Friends have remarked that he looks "much paler." Face is considered normal by parents. Weight is 42 pounds, 10 ounces. With the exception of the front and back of neck and the abdomen from the ensiform to the upper thighs, the body is of normal color.

Peroxid of hydrogen (1:3) was advised as a twice daily application to the neck.

March 24th. There is a general improvement and there are no evidences of pigmentation other than perhaps a little darkening of the back of the neck.

Arsenic, more particularly in the form of Fowler's solution, is so frequently prescribed in pediatric practice, that the possibility of its causing diffuse pigmentation and keratosis, to say nothing of erythema, papules, vesicles, urticaria, zoster, ulceration and neuritis, should be kept in mind. These conditions must be relatively infrequent, for no less a clinician than Henoch (tenth edition, page 199) says: "Up to the present time I have observed neither zoster, erythema nor brown pigmentation of the skin after the use of arsenic." The recognition of these conditions, however, becomes all the more important since a continuance of the drug after the initial manifestations may produce a permanent discoloration of the skin and keratosis of the palms and soles, while a discontinuance of the medication, which goes with the diagnosis, is frequently followed by a cure or a decided improvement.

Dr. D. B. Lees (ARCHIVES OF PEDIATRICS, January, 1902) reports a case of arsenical neuritis which followed the use of Fowler's solution (m. xv. t.i.d. for five weeks) for chorea. There were complete paralysis of the anterior tibial muscles in both legs, absent patellar reflexes and weakness of the wrist extensors in addition to a marked pigmentation on the abdomen and both axillæ.

Guaita (quoted by Morrow in his classical "Drug Eruptions") "reports that in 14 children placed upon Fowler's solution for four or five months, there was observed a bronzed appearance similar to that of Addison's disease, beginning on the neck, extending to the chest and then to the abdomen and hands; at times it is seen on the back and legs. It disappears by desquamation in about four weeks."

My treatment of the case, apart from the immediate with-

drawal of arsenic, consisted in meeting indications as they arose. The mother was assured of the absence of any constitutional disease and the probability of the disappearance of the pigmentation was expressed. General hygienic and dietetic rules were given. Itching was relieved with calamine and zinc lotion, the keratosis was controlled with olive oil and subsequently with salicylic acid. The last remains of pigmentation on the neck were treated with daily applications of hydrogen peroxid (1:2). Internally, iron was administered first in the form of ferro-mannin, and finally, a combination of the chlorid tincture with dilute phosphoric acid.

274 Lenox Avenue.

The Operative Treatment of Suppurative Meningitis.—

Kummell (*Arch. f. klin. Chir.*, Bd. 77, Heft 4) is of opinion that the progress recently made by the operative treatment of suppurative and tuberculous peritonitis is such as to favor the supposition that active surgical intervention might improve the very serious prognosis in cases of diffused inflammation of the meninges of the brain and cord. Lumbar puncture, it is stated, has been followed by very good results in cases of cerebrospinal meningitis, and circumscribed suppurative meningitis set up by middle-ear disease and by compound fracture of the skull has been successfully treated by free removal of cranial bone and drainage. The prospects of operative treatment are generally regarded as much less favorable in diffused suppurative leptomeningitis, and, according to Macewen, such treatment is quite hopeless when the inflammatory mischief has extended from the base of the cranium to the cauda equina. The author reports a case in which intense and extensive meningitis following a fracture of the base, clearly indicated by the presence of pus in the fluid removed by lumbar puncture, was successfully treated by making two large openings into the posterior cranial fossa and excising the exposed portions of dura mater. Another case is referred to in which free exposure of the spinal canal in the lumbar region relieved to a considerable extent the more serious symptoms of fatal diffused cerebrospinal meningitis following removal of a tumor from the sacrum.—*British Medical Journal*.

ARCHIVES OF PEDIATRICS.

JANUARY, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

Contributors and Correspondents, see page III.

RELATION OF THE TEETH TO MOUTH-BREATHING AND TO HEALTH.

Occlusion is the term used by dentists to denote the relation which the teeth of one jaw sustain to those of the other when the teeth are brought into contact. Normal occlusion may be defined as the accurate fitting of the occlusal planes (or normal contact points) of the teeth of one jaw with those of the other when the jaws are closed.

An examination of such an occlusion would show the antero-external cusp of the upper first molar accurately fitted into the sulcus of the lower first molar; those teeth posterior to these would sustain a like relation, while those anterior to them inter-

lock with one another in the interspaces, except the upper incisors, which overlap the lower about one-third their length. The same relative relation exists in the temporary teeth.

When these relations are interfered with, as they may be from a variety of causes, then it is that the teeth are brought into contact at abnormal points, and there obtains what is called mal-occlusion.

Mal-occlusion of the teeth, as one of the evil effects of mouth-breathing in young children, is the one which, perhaps more often than any other, is neglected in the consideration of this pernicious habit. Yet it is entitled to take first rank among the evil consequences which follow any considerable continuance of the practice. The removal of the cause, and the establishment of normal breathing, will in every other instance be followed by a return to normal conditions, while this symptom, with the lack of development dependent upon it, will continue throughout life as a handicap and disfigurement, unless it be recognized early and treatment instituted for its correction. More than this, in many cases, especially those of considerable standing, it will be found necessary to correct the mal-occlusion and bring about natural development of the maxillary bones before normal nasal breathing can be established.

The function of the nasal cavity in warming, filtering and moistening the inspired air, of the healthy adenoid in depriving it of germ life; and further, the incomplete oxidation of the blood, the inhibiting influence upon the circulation at the base of the skull, the incomplete emptying of the ethmoidal veins which follows when these processes are interfered with, are too well known to need repetition. It is the purpose, rather, to direct attention to the etiology of one class of mal-occlusion, to its disfiguring effect, the line of treatment necessary for its correction, the age at which this may be instituted, and the probable prognosis.

First in the list of the causes of nasal stenosis is the hypertrophied adenoid. Enlarged turbinated bones, deflection of the nasal septum and hypertrophy of the tonsils may also act as con-

tributing causes. Cases are also reported where elevation of the palate bones may, because of their encroachment upon the floor of the nasal cavity, so impinge upon the turbinated bones as to seriously interfere with normal breathing. It would seem, however, from present knowledge that this is never more than a contributing cause, but one which should receive consideration in the treatment of these cases. But whatever may be the causes of nasal stenosis, which result in mouth-breathing, it is probable that in a large per cent. of those cases where it is continued for any considerable length of time, mal-occlusion of the teeth, with all the evils which attend it, is inevitable. It will probably be found to be proportionate to the age at which it was begun and the period of its duration. Of prime importance, therefore, is its early recognition and the removal of the cause. The form of mal-occlusion which characterizes the mouth-breather is posterior occlusion of the lower jaw, which may manifest itself only on one side; depression of the bicuspid and molars in their alveoli; considerable narrowing of the arch in this region, while the incisors and canines have a labial inclination, associated with elongation. In the superior maxillæ the arch is correspondingly narrow, the molars and bicuspid depressed, the incisors and canines elongated and protruding from the mouth, frequently making closure of the lips impossible. In the temporary teeth the effect is less marked, probably because the conditions producing it have not been operative for a sufficient length of time to greatly influence them. The most noticeable effect is slight posterior occlusion of the lower jaw, slight rotation of the incisors and undeveloped jaws, made manifest by the lack of spaces which should appear between the teeth prior to the eruption of their permanent successors. An examination of the mouth will reveal considerable elevation of the palate bones, lack of development of the alveoli, which will be especially marked in the incisal region of the upper jaw, and noticeable in the facial disfigurement always present in these cases. To attempt the correction of mal-occlusion without the removal of the cause and the establishment of normal breath-

ing, so far as that may be possible, is but to invite failure. The co-operation of the rhinologist must therefore be secured and the obstruction in the naso-pharynx removed. Treatment for mal-occlusion may then be commenced. It may be laid down as a general principle in the treatment of these cases that the extraction of teeth is contra-indicated. That circumstances may arise making it advisable no one will deny, but it should only be done after the most careful consideration. Perfect occlusion can never be obtained, nor can complete development of the facial bones and nasal passages, where extraction has been practised.

The broadening of the arches, the retraction of the upper front teeth, the rotation of such as may be necessary to insure their occupying their normal position in the arch, the guiding of the lower jaw forward into normal occlusion, is the treatment which should be carried out in these cases. These various movements may be carried on simultaneously and with little or no inconvenience to the patient. The appliance by which it is accomplished may be a comparatively inconspicuous one, and in no way interfere with the daily avocation of the child. Having placed them in normal positions it will be necessary to retain them there for a year or more, a thing which is easily accomplished when normal occlusion has been obtained.

The age at which this treatment may be begun may be said to be as early as it becomes evident that the permanent teeth are not going to erupt into normal position. By the aid of the X-ray accurate measurements of these teeth may be obtained before eruption, and a careful estimate of the space required may be made. Generally, however, mal-occlusion of the permanent teeth may be diagnosed by an examination of the mouth and the teeth of the temporary set. Thus it is that mal-occlusion may be anticipated and the expansion necessary, obtained during the eruption of the permanent teeth, and while many of the deciduous teeth are still *in situ*. This treatment carefully carried out may be said to be a painless one. Certain it is that it may be undertaken by any child without in any way impairing the general health. This may seem

an exaggeration to one not familiar with the physiology of tooth movement, but it is abundantly supported by clinical observation. The improvement which follows this operation is marked. The development which has taken place in the maxillæ has been participated in by all the bones of the face and cranium. The various meatuses and sinuses have also been participants in this development. There is consequent improvement in respiration, in the greater resonance of the voice, in general health and mental calibre. A notable achievement is the marked improvement in facial harmony. Nor have the teeth themselves failed to participate in the improvement which follows as the result of this operation, as they are rendered less susceptible to caries, to pyorrhea alveolaris (Riggs's disease), and later in life, to almost inevitable fracture at the points of mal-occlusion. In fact, it may be said that there are few operations which one may be called upon to perform on children which are so far reaching in their beneficent effect. Upon the physician, and especially upon the pediatricist, rests the responsibility of these cases. It is they, and not the dentist, who have these little patients under observation at the age when nasal obstruction is most likely to occur. They should be quick to note the first evidence of it, and see to it that a careful examination of the nasopharynx is made with a view to preventing the evil consequences which may follow as the result of mouth-breathing. Nor will their responsibility always end here. They are the advisers and counselors of the parents, and until they have secured the co-operation of a specialist, one qualified to aid them in their care of these cases, they have done less than their duty. It has been said that a large per cent. of the cases treated by the rhinologist are discharged as cured, without any reference being made to the necessity of correcting the mal-occlusion of the teeth which may also exist. There can be no doubt that many of the most aggravated cases which are presented for treatment have become so through neglect. It has been charged as a reflection upon the learning of the medical and dental professions and upon the intelligence of civilized parentage,

that children should be so neglected as to permit a pathological condition to remain unattended through their developmental period, as to affect the growth of mind and body, and if uncared for, to leave its deforming mark upon the face and jaws throughout life. It is only through an intelligent appreciation of these evils, and the co-operation of the physician and dentist, that they can be reduced to a minimum. It is, however, in early recognition of the condition that we render our highest service; that preventive medicine expresses itself in its most beneficent form, and nature is given an opportunity to perform her perfect work.

ARTHUR H. MERRITT, D.D.S.

AN IMPROVEMENT IN THE DEPARTMENT OF CURRENT LITERATURE.

Beginning with the present number of ARCHIVES OF PEDIATRICS the abstracts in the department of Current Literature will be made by men who are engaged in pediatric work in the hospitals and clinics in New York, and who are also familiar with the best literature on the subject. The abstracts will be signed, and the following named gentlemen will, among them, cover the literature of the world relating to pediatrics:—

Dr. H. Adler, Dr. L. C. Ager, Dr. V. Agostini, Dr. A. W. Bingham, Dr. C. Townsend Dade, Dr. W. A. Dunckel, Dr. H. Heiman, Dr. A. F. Hess, Dr. J. Howland, Dr. M. Nicoll, Jr., Dr. G. R. Pisek, Dr. A. S. Taylor, Dr. S. W. Thurber.

It is intended to make the department even more important than heretofore; and with the aid of this able staff the editor feels assured that the readers of ARCHIVES will find in it a most valuable means of keeping abreast with the literature on children's diseases.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, October 11, 1906.

MATTHIAS NICOLL, JR., M.D., CHAIRMAN.

NEW GAS-ETHER INHALER.

DR. VICTOR COX PEDERSEN demonstrated this device.

REPORT OF A CASE OF PARALYSIS OF THE ABDUCENS NERVE FOLLOWING INFLUENZA.

DR. ANNA S. WILNER presented this communication, which was read by Dr. Barry. It will be found in full on page 18.

DR. ALFRED F. HESS asked why the reader of the paper felt sure that the condition presented by the child was of influenzal origin. It seemed to him that most or all of the symptoms could be caused by some other organism; the heart symptoms could have been caused by either the pneumococcus or the diphtheria germ. No blood culture had been made and no lumbar puncture. He failed to see why the reader of the paper thought the condition to be due to influenza.

DR. BARRY replied that she knew nothing of the case, and the paper had just been handed her to read.

REPORT OF A CASE OF SPLENECTOMY FOR SPLENOMEGALY IN A CHILD EIGHT YEARS OLD, BY DR. DAVID BOVAIRD, JR.

The patient, a girl of eight years, was admitted to the Presbyterian Hospital May 8th of this year with the following history: She was born in England and had lived there till seven weeks before her admission to the hospital. She was the third of five children. The parents are both well. There is no history suggestive of specific disease in the family. All the other children are sound. The birth of this child was normal. She was nursed for eleven months and was well during this time. There was no history of rickets. She was never robust, and was always easily fatigued. When eighteen months old she had measles, followed

by pneumonia. In August, 1905, she began to have a persistent cough with occasional hemoptysis. For this the patient was in the Metropolitan Hospital, London, England, for five weeks. Shortly afterward she had scarlet fever and was in the hospital for seven weeks. There is no history of rheumatism, typhoid or malaria.

History of present trouble.—Since having the scarlet fever she has not been strong and has been gradually losing flesh and strength. She has had frequent epistaxis and a persistent cough. She has complained at times of abdominal pain, vague both in location and in character. The attacks of abdominal pain have at times been frequent and severe.

Bleeding from the gums sometimes follows coughing. She has also had some pain in the chest with the cough, but lately the cough has not been as severe as it formerly was. The patient was taken to the Out-patient Department of the Babies' Hospital, where she was seen by Dr. Van Ingen, who discovered the enlargement of the spleen. She was sent to the Presbyterian Hospital and was admitted on May 8th. The notable features of the examination at that time were as follows:—Easily bleeding gums. A liver which extended from the fourth rib in the mid-clavicular line to one inch below the free border of the ribs. A spleen which extended from the seventh space in the axillary line to the level of the anterior spine of the ilium below and on the right to a point two inches to the right of the umbilicus; a few rales at both bases behind and a slight degree of jaundice, visible in both the conjunctivæ and skin. The child was kept under observation for seven weeks. During that time her cough subsided and the general condition improved somewhat. Examinations of the blood showed a moderate grade of anemia, no leukocytosis, a moderate increase in the lymphocytes in the differential count. The urine was normal. The condition was regarded as a splenic anemia belonging in the class of Banti's Disease.

After careful consideration the removal of the spleen was advised. The operation was done on June 28th by Dr. McCosh. The patient made a good recovery. She was kept in the hospital for a month and then sent to the country. She has continued to improve steadily, and now reports herself as being in excellent condition. She is still in the country, so that she could not be presented to the Section.

The only notable change in the blood following the operation

was the development of a leukocytosis of from 20,000 to 25,000. This persisted during her stay in the hospital. There was no marked change in the differential ratios.

The spleen removed weighed almost two pounds. The appearance was that of a normal organ except for the presence of a broad yellowish plaque just beneath the capsule on the external surface. This plaque proved to be a deposit of fat. On section, the Malpighian bodies were prominent enough to suggest miliary tubercles. The microscopic examination, however, showed only a simple hyperplasia of the organ.

DR. HENRY EWING HALE, JR., said that in March, 1905, he saw a girl of seven or eight with liver and spleen in practically the same condition as the one reported by Dr. Bovaird, and shortly after he was fortunate in having Dr. Bovaird see the patient. Tonic treatment had been given for months. During the summer the patient was under Dr. Osgood's care, and X-rays were used twice a week without making any impression upon the size of the spleen. There was an increased leukocyte count immediately after the application of the X-rays. Dr. Hale saw the patient again last Fall and then lost sight of her for some months. He again saw her last Spring and the leukocyte count was low, as low as 2,000, while the differential count was perfectly normal. The spleen extended two and a half inches to the right of the median line opposite the umbilicus. It reached the pubis close to the median line. Dr. McCosh advised operation. Dr. Flexner examined the blood, but found nothing of special interest. This patient then went to another hospital and no further report of the patient had been received.

REPORT OF A CASE OF SEPTIC ENDOCARDITIS.

DR. W. C. GARDNER read this paper, which will be found in full on page 24.

DR. SIDNEY VALENTINE HAAS said that nine years ago he saw an adult suffering from general septicemia following a wound infection treated by antistreptococcic serum with prompt recovery. The patient was a young woman, eighteen years old, who gave a history of a nasal operation some months previous. Upon admission she had high temperature and pain in the tibia just below the knee. She was operated on, but she grew worse. Pericarditis, endocarditis and meningitis developed, and she was taken to the operating room to have an amputation done at the

hip, but the consulting surgeon advised sending her back to her room and allowing her to die with the extremity on. The house surgeon suggested trying antistreptococcic serum, and this was consented to, the attending surgeon willing to do anything for her. This was used, and the next morning she was no worse, and the day following she was better. At the end of four days she was practically well, and in two weeks' time she left the hospital, although she had all the classical signs of meningitis, endocarditis, pericarditis, and general pleurisy, the usual picture of an acute septicemia which ends fatally.

DR. LA FÉTRA said that Dr. Gardner had brought out two points of importance. In the first place, in all septic processes, as in any kind of disease in the body, one must realize that, varying with the virulence of the germ and the resistance of the patient, there will be different severities of the body reaction. In thinking of septic endocarditis we should bear in mind that the term is a very wide one, and can include grades of infection or sepsis which the patient may successfully combat.

The other point was that blood cultures in these cases are absolutely necessary, not only for diagnosis, but also for treatment. Unless we can find the particular type of streptococcus, and unless we can identify the various strains and get a particular antistreptococcic serum for that strain, we must fail, in most instances, to save the patient. The best we can do at present is to use a mixed, or multivalent, streptococcic serum, as has been done by Moser in treating scarlet fever.

DR. DAVID BOVAIRD, JR., said he was very much interested in Dr. Gardner's report of his case, and Dr. Gardner had frankly stated the objections himself. The diagnosis might be questioned; at the same time he believed it to be a reasonable diagnosis. The recovery of the patient did not justly nullify the diagnosis. All must recognize the fact that in infective diseases one may meet with all grades of manifestations. The more one studied endocarditis the more clear it became that we could not safely draw a line between simple endocarditis with fever and malignant endocarditis. That the antistreptococcic serum had anything to do with the patient's recovery he doubted. All were familiar with such stories in the literature. The more one used the antistreptococcic serum the less confidence one had in it, and for the reason that one could not be sure of getting a serum of the particular

strain of streptococcus. He referred to the experiments of Dr. Thacher this year; the doctor isolated from the blood of a patient with malignant endocarditis the organism and Dr. Park prepared the serum. The patient lived long enough to give an extensive trial, but no effect was gotten from the serum at all. He had had considerable experience with the antistreptococcic serum and without any favorable results.

DR. WILLIAM C. GARDNER said that he did not wish the members of the Section to think that he was an enthusiast on the use of antistreptococcic serum. So contradictory did he find the reports of those who had used it that he wanted counsel before administering it in this case. Whether the value of the serum depended upon its close relationship to the infecting organism or not he did not know. It was possible that there was some relationship between the two that we did not understand at all. At any rate, the wonderful results produced by serum treatment in certain reported cases could not be ignored. Dr. Gardner said that the inference he drew from published reports was that the serum was a brilliant success or an utter failure; that it seemed to have no half-way characteristics. He advocated its use in cases like the one reported, for he did not know of anything else that was helpful.

DR. GEORGE D. SCOTT said that investigation at the Boston Eye and Ear Infirmary had shown that Unguentum Credé, as also argyrol, were only mildly antibacterial in comparison with the other silver preparations tested.

Bladder Stones in Children.—The tabulated results of Winternitz's operations (*Jahrbuch für Kinderheilk*, Vol. LXII., No. 3) for bladder stones in children certainly speak in favor of his technic. He crushes the stones and removes them by suction through a tube when the concretions are movable and crushable, the bladder and upper urinary passages free from infection, and the urethra at least as wide as a No. 16 Charnière sound. When the urethra is smaller than this, or when obstinate catarrh of the bladder or posterior urethra resists treatment, then he resorts to the high incision. He examines with the cystoscope to see if any fragments have been left behind after crushing the stones, and on this account does not attempt to crush them when the children are too small to allow the introduction of the cystoscope. He tabulates the details in 28 cases.—*Journal of the American Medical Association*.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, October 16, 1906.

J. W. VAN DERSLICE, M.D., PRESIDENT.

DR. J. D. MERRILL presented specimens showing

MULTIPLE ULCERS OF THE STOMACH AND ULCERATION OF PEYER'S PATCHES, FROM AN INFANT DYING OF GASTROENTERITIS.

The patient was a baby one year old, who came under her care thirty-six hours before death. When first seen there were noted:—Sunken eyes and fontanel, wrinkled atonic skin, imperceptible radial pulse and rectal temperature of $104\frac{1}{2}^{\circ}$ F., with a cold surface.

There was no vomiting or diarrhea while under observation, neither was there the slightest response to stimulation or other medication, excepting some reduction of temperature. She was a waif, hence the family and past histories were imperfect. The following was obtained:—She was always bottle-fed and a difficult feeding-case until March, 1906, when gray powder was given for several weeks with apparent marked improvement. There had never been any vomiting of blood. She thrived until a hot spell in August when she became feverish, vomited and had a diarrhea of moderate severity. The third day she grew rapidly worse, and presented on the fourth day the serious condition above described, dying on the fifth day.

Autopsy by Dr. LeCount twelve hours after death:—"The body is that of an infant about one year old, fairly nourished and developed.

"Stomach.—This contains many ulcers, beginning shortly above the pylorus and reaching in depth to the muscular coats. They occupy a patch along the greater curvature on either side for a distance of $1\frac{1}{2}$ cm. The largest ulcers measure 5 mm. in diameter. The total number, large and small, approximate 50. There was no injection of blood vessels nor even slight hyperemia around these ulcers. The mucosa of the stomach was pale.

"Intestines.—The lymphoid tissue of the ileum just above the ileocecal valve appears swollen, and higher up Peyer's patches not only appear swollen, but are slightly eroded. Small enlarged

lymph nodes occur along the mesenteric attachment of the bowel. Marked enlargement of all the mesenteric nodes is present, many being as large as white beans.

"Cut surfaces of kidneys and liver are gray and opaque, otherwise normal. The peritoneal, pleural and pericardial cavities all contain a turbid, slightly colored fluid.

"*Bacteriology*.—In the cover-glass preparations of the heart blood, abdominal fluid, right and left pleura, pericardium, kidney, liver, spleen and abdominal lymph glands, small, Gram-positive cocci were found, some singly and others in chains. In addition, a short, thick, Gram-negative bacillus was found in the liver, spleen, kidney and abdominal lymph glands. By cultures strepto- and staphylococci pyogenes aureus were isolated from all the fluids and organs. Bacillus coli was isolated from the kidneys, liver, spleen and all abdominal lymph glands."

RÉSUMÉ OF GASTROINTESTINAL DISEASES.

DR. J. W. VAN DERSLICE.—The subject of gastrointestinal diseases, which occupies our attention this evening, is considered at an opportune time at this, our first meeting of the year.

In looking over the literature upon this subject one must admit that the classification of the diseases is practically in the same condition as a decade ago. It is evident that these cases are far less frequent than formerly. In our service at the children's clinic of Rush Medical College during the summer quarter of this year there were but 126 in a series of 486 cases, this including all cases of disorders of the digestive tract. That this is the direct result of the agitation for pure milk and the education of the laity to a broader view of the advantages of the simple rules of hygiene there can be no doubt. G. W. Goler, of Rochester, has shown a direct relationship between the bacterial count of the milk and the death rate of early life.

Gastrointestinal disorders are diseases of the crowded centres of population. The greater number of cases of summer diarrhea come to us from the tenements of the large cities. They are in the families where the cheaper, poorer foods are bought, and where hygiene is unknown. The prime etiological factor is the ingestion of improper food, improper as to quality, quantity, frequency of feeding, physical condition of the food, or as to its preparation. Volumes have been written upon the effect of hot

weather, how it lowers the vitality of the child, lessening its resistance, or how atmospheric conditions favor the development of bacteria harmful to the host. We do know by experience that a few humid hot days largely increase the number of cases. That these cases of summer diarrhea are largely preventable is shown by the few cases in breast-fed children and the comparative rarity in artificially fed children when the hygiene and sanitation are good. That fresh air is the prophylaxis of greatest value should be emphasized, especially to the parents. The child should be kept in the open air as much as possible. Where it is impractical to send the child to the country, it should be taken to the parks or kept in the baby buggy out of doors the most of the day.

Notwithstanding the enormous amount of valuable scientific work on the bacteriology of these diseases in recent years by Booker, Flexner, Duval, Bassett, Weaver and Cook, our diagnosis must still be made anatomically, according to the region most involved. Even then, however, symptomatically it is impossible to differentiate between the various forms of summer complaint.

One point brought out by Dr. Cotton in *International Clinics* (Vol. II., Series 13), which I have failed to see noted by other authors, and which I believe throws much light on these cases, is "that the systemic disturbance which is an expression of intoxication from the stomach and bowels diminishes proportionately with the distance from the stomach at which the burden of the disorder seems to fall. Thus in the most obstinate cases of colitis with extensive lesions of the mucosa, nutrition is frequently maintained to a remarkable degree, the child showing but little evidence of systemic intoxication; whereas a much less obstinate disorder of the small intestine may cause prostration with symptoms of general collapse. In other words, the more active the digestive area involved, the more profound the constitutional disturbance and the greater the tendency to collapse."

Of the sequelæ of summer diarrhea, one of vast importance to the future well-being of the child is dilatation of the stomach. Often we have brought to us a little weazenened infant, eight to ten months of age, weighing only ten or eleven pounds, and find that this child is taking from ten to twelve ounces of milk mixture and apparently digesting it, but with still no adequate increase in weight; whereas, when the amount of food is diminished and the child fed in ratio to its weight rather than to its age there is an

immediate increase. It is important that the convalescents from the digestive diseases be given food in small amounts and of such quality as will not overtax the motility of the organs affected. Dilatation and motor insufficiency with chronic gastritis is of all too common occurrence in early childhood.

In the treatment of summer diarrheas there seem to be five indications:—First, stop all food; second, remove the cause; third, rest to the affected part; fourth, allay thirst by cold water frequently given in small amounts; fifth, keep the surface temperature as nearly normal as possible—where the skin is cold apply artificial heat; to a hot, dry skin, cool sponging. All food is stopped for twenty-four hours. Plain water or gruel water is allowed in small amounts, frequently repeated.

The initial medicinal treatment is one-tenth grain of calomel given every hour for six doses, to be followed by a dram dose of castor oil. This should be enough to empty the stomach and small intestines. In the severer fermentative cases, immediately, or following the castor oil, a high colonic flushing is given. The first flushing is given under the personal supervision of the physician or by a trained nurse.

After the first twenty-four hours the child is given a milk diet with the addition of citrate of soda, one grain to the ounce of milk. The milk is diluted with an equal quantity of boiled water. The amount and number of feedings are governed by the weight of the child and its digestive capacity. Alcohol or opium may be indicated at times. We have as yet never found it necessary to give opium and have rarely allowed the giving of alcohol. The pain and tenderness can usually be controlled by the use of carminatives and local heat, or a thin mustard plaster made with the white of an egg. The intestinal antiseptics of the coal-tar group are too irritating to be of any value. Serum therapy is still in the experimental stage.

GASTRIC INDIGESTION.

DR. J. H. HESS.—To discuss the subject of gastric indigestion in detail would require a *résumé* of the developmental defects of the abdominal walls, the digestive organs, including the salivary glands, stomach and its glandular elements. But for practical purposes consideration of these will be omitted, except in so far as their capacity for work is diminished or under the average development, or the task imposed on them too great. Under this

general classification we may group the principal factors of acute indigestion with its resultant chronic form. Again, properly to consider this subject would necessitate a consideration of the premature and congenitally weak, the breast-fed, the artificially fed infants and older children. But, notwithstanding the apparent vastness of our field, we find the two previous mentioned factors—overwork and a primary or secondary diminution of function—as the principal causes.

Etiology.—Overloading of the stomach, with concurrent regurgitation due to excessive feeding, too frequent feeding, or too rapid feeding, either in breast or bottle-fed, can usually be easily remedied by a sensible mother; but when the child reaches a stationary period, or the early signs of atrophy appear, from insufficient retention of food, gastric dilatation or glandular atrophy, the problem grows more complex, and strenuous means are needed to combat the evil done; vomiting becomes more frequent, appears after ingestion of smaller quantities, and more closely follows the ending of the nursing period even before digestion has begun. With diminished glandular activity there is increased mucous secretion, and frequently, long before the condition becomes chronic, intestinal indigestion appears, with its usual manifestations, resultant upon an improper gastric functional activity. More important by far is the consideration of improper feeding. An acute attack may be precipitated by indiscretion on the part of the mother—food which is too hot or too cold may bring forth an attack, as may an occasional feeding of poor milk; but the phase of this subject with which we are most frequently brought in contact is that of too high percentages in the constituent elements of the food, and we find too high proteid, fat or carbohydrate proportions as exciting factors. Abrupt changes in diet or wearing apparel or changes in formula are also frequently causes.

Pathology.—In most cases the symptoms are in all probability referable to a failure in the secretion of the gastric juices and of the normal peristalsis; but here arises the difficulty of differentiating between the ending of a simple functional dyspepsia and a beginning catarrh, as the epithelium of the mucous membrane does not belong to it exclusively, but dips directly into the peptic and muciparous glands: thus the catarrhal condition of the surface becomes almost simultaneously a “parenchymatous” affection, and unless we have an early cessation of the causal factor we soon have a parenchymatous inflammation.

Treatment primarily must be directed to the removal of the exciting factor; *first*, such toxic substances or mechanical irritants as have already been ingested must be removed either by lavage, emetics or cathartics, followed by complete rest of the stomach. *Secondarily*, a complete change or correction of diet, if that be the potent factor; and *last*, but not least important, careful attention to developmental deficiencies. Other treatment must be symptomatic.

DR. A. C. COTTON said that the treatment of indigestion can not be presented. There may be a few general principles, but he doubted that he could say anything new on this subject. Most cases begin in simple dyspepsia, but once in a while a case begins as an apparent infection. The child is stricken suddenly and it appears as an infected case from the beginning. The first point in treatment should be to correct the conditions that obtain under which most of these cases begin; if of humidity and high temperature, certainly seek a lower and drier temperature, one or both if possible. If the child cannot be carried to the lake or to a northern latitude, the air of the room may be cooled in a very short time by simply using tubs of ice; five or six hundred pounds in a room about twenty feet square will lower the temperature ten degrees inside of an hour. Wired for electricity, as many homes are, electric fans may be employed. Of course, that does not render the air drier, but it does lower the temperature and produces marked benefit. So near is the lake, so cheap is transportation, so numerous are the boats and so frequently do they sail that if a doctor be in earnest he can very often induce the parents to pack their grip and make the trip to Mackinac. Great benefit comes from the lake shore sanitariums, or any lake shore locality where proper conditions exist. Remove a child from the basement which seems to be damp to the upper floors of a house.

Feeding, which would ordinarily be called physiological, becomes a serious error in hot weather. Not much is yet known about the mother's milk—only a few of the elements are known; it is not known yet how much the lacteal laboratory of the mother changes the constituency of the milk during extremes of hot and cold weather, but physiology teaches us to cut down those constituents of high caloric value in hot weather. No other member of the family eats as much heat-producing food during the summer, so that in artificial feeding no doubt all have followed the

plan of modifying the food according to the weather, cutting down the heat-producing elements during extreme heat and giving more water.

Notably then when the baby shows symptoms of indigestion, the food should be removed and in recovering from indigestion, whether it reaches the state of gastroenteritis or not, the food should be reduced, and should be entirely withdrawn immediately upon the appearance of gastric irritation or diarrhea. Castor oil is first and foremost as a means of cleaning out the decomposing material. Perhaps all have found that calomel in small doses will do much to lessen the apparent infection of the gastric tract. The time during which food is withheld depends upon the condition of the child, but it is well to insist that no food enter the mouth for at least twenty-four hours and that the remedy of starvation be begun on the first symptoms. Very rapid improvement is observed where this treatment is followed, and it is imperative that at the beginning food of any kind whatever be absolutely prohibited. Plenty of water should be used by mouth and enteroclysis is beneficial, not only because it removes promptly material that is irritating, but it also aids in lowering the temperature.

After removing the bacterial infection of the colon a small enema containing nutriment may be introduced into the rectum. Inunctions of oil are good, sweet oil, olive oil, or, preferably, Russell's emulsion, containing peanut, cocoanut, olive and clove oils and beef suet. Better results seem to follow from this emulsion than from sweet oil or cocoa butter alone. He does not use subnitrate of bismuth, as formerly, over a long period of time. It may interfere somewhat with the gastric function, digestion and absorption where large doses of bismuth are poured through the mouth. In gastritis with frequent vomiting, it is the first remedy to be used. Sometimes subgallate of bismuth is substituted and both may be given per rectum. Three or four drams of a solution containing 20 to 40 or 60 grains of bismuth subnitrate may be carefully injected and allowed to remain after the preliminary flushing has drained away. The subgallate may be employed in the same way, not in so large doses. He has used eudoxine, which does not seem to be much in favor, and he wonders whether he or the others are in error. But he has carried eudoxine now for a period of six or seven years or more,

and has administered it quite frequently in from one-half to three grain doses repeated three to six times per day. But each one has his own drugs upon which he has learned to depend. The use of opium is spoken of with great caution, but here it may be mentioned. Preparations of opium are certainly valuable in some of the diarrheas. After thoroughly cleaning out with castor oil, a judicious use of a preparation of opium is in order.

DR. ERNEST LACKNER said that on admission of patients to the hospital the gastrointestinal tract is cleaned as far as possible, using either castor oil or calomel, and during the last summer he had followed Heubner's treatment with very good results. Heubner does not consider the chemical constituents of the milk nor the percentages, but insists on the milk being sterilized. He considers that most of the diarrheas in children do not come from indigestion, although there may be irritating qualities in the food (as when the mother takes improper food, causing indigestion, vomiting and diarrhea in the child), or the poisoning of nipples, neglect of proper care of the mouth. Most of the gastrointestinal cases are from infection. He uses large percentages of proteids even in the first stage of feeding, without the so-called proteid indigestion. For instance, he will give one-third milk to children three or four days or a week old. When a child shows symptoms of infection he sends a nurse to ascertain the cause and usually finds that the mother has been neglectful in the use and care of the bottle, the nipples or something of that kind. By correcting these conditions and making the mother more observant and being insistent upon the sterilization, children have grown and digested these various foods. Those who were entirely prostrated on entrance—children six to nine months old, weighing nine pounds—have been put on this treatment and have no trouble.

Once in a while all the children suddenly show well-developed diarrhea, high temperature, and the stools contain mucus and sometimes blood. Whether it was that the milk received was highly poisoned, or whether the sterilization was not effective, by insisting upon strict sterilization these diarrheas all ceased. Other children suffering from rickets and from various other diseases caused by malnutrition in all cases gained very rapidly on this system of treatment, with no medication whatever. During the summer forty or fifty cases were treated as above. Of course, we have the lake front, and we insist upon taking our patients

out in the fresh air whatever the disorder, with great improvement.

DR. J. L. JACQUE said that the classification of the disturbances of the gastrointestinal tract in infancy under the general heading of indigestion should not go unchallenged. When, in the adult, after repeated analyses of the stomach contents, after test meals, or test breakfasts, the absence of hydrochloric acid as well as that of the digestive ferments is demonstrated, one is justified in speaking of gastric indigestion; but as this cannot be done in the infant, there are no means of ascertaining whether in a given case it is indigestion or something else that is to be dealt with. Impaired motility of the stomach has been mentioned. In this case the gastric digestion may well be satisfactorily accomplished, but on account of the inability of the stomach to empty itself within a reasonable time, stagnation with the resulting decomposition and putrefaction of its contents takes place. The gastric mucosa becomes irritated and emesis follows, or when a part of this stagnating material is forwarded into the intestinal tract, disturbances of the latter result.

For the diagnosis of intestinal indigestion, colic and diarrhea have been mentioned. Colic is often observed in very healthy, even breast-fed infants, and diarrhea is not necessarily a symptom of indigestion. The higher part of the small intestines can be diseased and its digestive functions impaired without giving rise to much diarrhea. The latter symptom becomes prominent only when the colon becomes involved. But by the time the food reaches the colon the digestion is about completed. The diseases attacking the mucous membrane of the latter cause a very severe diarrhea, but one would hesitate to call this intestinal indigestion inasmuch as the colon is not endowed with great digestive powers. The presence in the stools of neutral fat, unchanged bile and bile-stained epithelial cells would point toward disturbances of digestion in the small intestines, but as this may depend upon defective pancreatic secretion, upon increased peristalsis, etc., an attempt should be made to locate the seat and nature of the disease, and not resort to the very indefinite and uncertain term "intestinal indigestion."

DR. EFFA V. DAVIS said she agreed with the previous remarks in the main, but thought there were disorders which come from the quality of the food administered and not from

infection, though infection is the thing most commonly to be fought. She had treated in the last two or three years five babies under five months with pronounced gastritis, and so far as she could judge there was no infection connected with the disorder. The stools were normal, showing good intestinal digestion—but the babies were growing thinner and thinner because of the rejection of food.

These patients were all cured by washing out the stomach and feeding on condensed milk.

There is an element in raw milk which irritates such babies' stomachs. All of these cases developed outside of her nursery and some had been attended by skilled physicians, but all had experienced many and abrupt changes in their food. Raw milk, which irritates the stomach in such cases, seems to contain some element, probably lactalbumen, which is altered by cooking. In one of these cases this was rather pronouncedly shown. The child had been fed on whey, which it rejected promptly after each feeding—but the medical attendant kept on giving whey. It was dropped after the child had been brought to her and a condensed milk formula substituted. Together with lavage this change seemed to correct things promptly and the babe was soon gaining. The whey, which contains lactalbumen, was increasing the mischief, though possibly in the beginning the child might not have rejected it before the stomach had been injured by improper feeding.

DR. J. H. HESS said it always made him feel badly to have a doctor prescribe condensed milk and he had a substitute for it. That is the old-fashioned German Liebig soup. It answered the same purpose and he wished Dr. Davis would try it. Just as sure as families were told to use condensed milk the babies did poorly. He would like to ask if any one present had had any experience with the Backhaus milk as prepared in Milwaukee. It is a milk low in proteids, prepared by the addition of rennet, pepsin and carbonate of soda to skimmed milk and heating to 40°C., thus removing the curds. By adding cream and sugar of milk to the whey the lower formulæ are prepared. For the higher proteid formulæ, skimmed milk is added. The whole is then heated to 80°C. Four formulæ are prepared.

His experience with it has been that if handled roughly in

transportation, there would be a lot of butter on top. If carefully handled in shipping this is avoided. His experience has been only with four patients: one, the baby spoken of in the paper, a pair of twins that had loose stools throughout the entire taking of it, and one baby with whom he had a very good result.

DR. JOHN C. COOK said it was impossible to cover the entire ground, but there are one or two points worth mentioning.

It is generally assumed that if a child is not digesting its food it has a diarrhea. This is not always true. Dr. Jacque made a nice distinction, however. Many times, while the digestive apparatus is all right, there will be indigestion because more food is put into the stomach than the child can digest. Indigestion with constipation in some months gives quite as much concern as diarrhea. The constipation has seemed to be the result of infection, in which a sort of paralysis or paresis of the intestinal canal had followed peristalsis.

There is one other element: in the large number of institutional cases, where the food was apparently the same, the element of crowding children, allowing too many in the room, the element of bad air, has seemed to have more influence than formerly suspected. For two or three years the mistake has been made at his little hospital. The demand has been so great for space during the hot months that every year he has been induced to put in one more baby, thus cutting down the number of cubic feet allowed to each child, and invariably the whole ward starts off with diarrhea, on the same food previously used. It may be called indigestion or not, but it is an element well worth considering. There is space for twelve babies, and this year against better judgment the thirteenth baby was allowed to go into the ward, inside of twenty-four hours every child which had had any slight disturbance, such as two or three movements in twenty-four hours, had increased the number of movements to five or six or seven, with mucus and other disturbances, indicating that the crowding had something to do with it. Private homes show a room with one baby and four or five adults. The child is not disturbed by the food, but the lack of good, pure air to breathe causes nervousness; it becomes restless, fretful and the temperature goes up. This is an element worth considering in the treatment of summer diarrhea in children.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. A. W. BINGHAM,
DR. HENRY HEIMAN,
DR. ALFRED F. HESS,

DR. GUS R. MANNING,
DR. G. R. PISEK,
DR. A. S. TAYLOR.

PATHOLOGY.

Basch, Karl: Contribution to the Physiology and Pathology of the Thymus. (*Jahrbuch für Kinderhk.*, August 8, 1906, p. 285.)

At first classified with the lymphoid structures of the body, it has been proven by the work of Kölliker, Hammar and Stöhr that it is embryologically, structurally and chemically an epithelial organ. Friedleben made the first important contribution to the physiology of the thymus, but his conclusions were incorrect, as his technique was faulty in that he failed to remove the entire gland. Basch made his observations on very young dogs. In the removal of the gland he first split the sternum lengthwise, thus obtaining good exposure of the whole field of operation and insuring the removal of the entire gland. As a result of his studies, he comes to the following conclusions: The ecthymized dogs were smaller, less intelligent and lively, and more easily fatigued. The bones, especially of the extremities, were softer and more readily fractured. In the healing of artificial fracture the callus was smaller and ring-shaped instead of spindle-shaped, as in the normal animal. Microscopically, the compact layer was thinner in the diaphysis, and the epiphyseal line was wider and more irregular. There was no hyperplasia of the lymphoid tissue.

HENRY HEIMAN.

Dieterle, Theophile: The Relation of Endemic Cretinism to other Types of Maldevelopment. (*Jahrbuch für Kinderhk.*, September 4, 1906, p. 465.)

In chondrodystrophy the type of growth is always micromel, whereas in cretinism the growth of the extremities is in proportion to that of the trunk. Chondrodystrophy is a *fetal* skeletal disease, and the changes in the bones are evident at birth, whereas cretinism can never be diagnosed at birth. Chondrodystrophy is sporadic and does not occur frequently in regions where goitre is common. In endemic cretinism there is delayed ossification at the epiphyses. This delay usually amounts to a few years, but after the age of twenty-five all the epiphyses have become ossified. In cases where there is entire absence of the thyroid (athyreosis) complete ossification of the epiphyses never takes place. The author thinks that in endemic cretinism the thyroid

is not primarily involved, but that its function is disturbed as a result of some constitutional disease.

HENRY HEIMAN.

Neisser, A.: The Present Position of Experimentation on Syphilis. (*Deutsche Medizinische Wochenschrift*, October 11, 1906, p. 1,687.)

All experimenters agree in the great difference in susceptibility between the lower and higher apes. Inoculations upon the intact skin or mucous membrane, or subcutaneous or intravenous injections proved negative. In one instance he was able to produce syphilis in an ape by sectioning the testicle and implanting a bit of syphilitic tissue in the organ.

No increase nor decrease in virulence has been observed by passing the syphilitic material through a series of animals. In order to judge of the time of onset of general infection, he injected numerous animals with the blood of infected apes, and found that this was capable of causing syphilis even before the primary lesion had appeared. The semen and milk of these animals proved negative, whereas the spleen, bone-marrow, glands and testicle gave positive results. Secondary symptoms were seen in the cases of all anthropoid apes, but not in the lower varieties.

The Wasserman-Bruck serum reaction was of value. It proved positive in 77 per cent. of the cases, and in doubtful cases coincided with the later symptoms. It was obtained with the blood, tissues and spinal fluid, and was missed in the tests on non-syphilitic individuals.

Therapeutic measures were tried experimentally. Excision of the point of inoculation was of value only if carried out a few hours after the injection was made. To counteract infection cauterization with 2 to 3 per cent. carbolic acid or corrosive sublimate, or the application of calomel proved of value; however, 1 per cent. corrosive sublimate, blue ointment, iodoform and other antiseptics were of no value.

ALFRED F. HESS.

Raw, Nathan: Human and Bovine Tuberculosis. The Danger of Infected Milk. (*British Medical Journal*, August 18, 1906, p. 357.)

Human and bovine tubercle bacilli are divisible into two distinct types of a common species. Long-continued residence in a

particular host has resulted in the bacilli assuming distinguishing characteristics. They produce different and characteristic lesions in the human body, and they show distinctive cultural differences when grown in the same medium.

While the author firmly believes that human and bovine bacilli are different types of parasites, yet he is convinced that bovine bacilli are fully communicable to humans and are the cause of a large amount of tuberculosis in children. He concludes that infection by human bacilli is conveyed from person to person and causes primarily pulmonary tuberculosis and secondarily tubercular ulceration of the intestine by swallowed sputum.

Infection of bovine bacilli takes place in the digestive tract from tuberculous milk and dairy produce, and causes other forms of tuberculosis, such as tubercular adenitis, tubercular peritonitis, tubercular joints and probably tuberculous meningitis and lupus. The author thinks that human tubercle bacilli do not attack the ordinary lymphatic glands of the body.

Until tuberculosis is reduced in dairy cattle, where it at present prevails to the extent of between 20 and 25 per cent., there will not be much reduction in the mortality from tuberculosis in children.

Human and bovine tubercle are antagonistic to each other in the human body. It has been shown that human bacilli produce immunity in cattle, and it is natural to suppose the converse—that bovine tubercle in children will protect them against human tubercle or phthisis.

Human and bovine tuberculosis are distinct varieties of disease, but the human body is susceptible to both, and especially to bovine tuberculosis in the milk-drinking period of life.

A. W. BINGHAM.

Beitzke, W.: Spirochetæ Pallida in Congenital Syphilis.
(*Berliner Klin. Woch.*, June 11, 1906, p. 781.)

Beitzke studied 18 cases. In 4 cases no spirochetæ could be found in the spreads. But in all the remaining cases the author succeeded in finding the spirochetæ in sections stained by Levaditi's method. The spirochetæ were most abundant in the liver. In 4 normal cases and in 3 cases of syphilis which had received proper treatment he was unable to find any organisms. No spirochetæ were found in sections of bones showing the typical changes of syphilitic osteochondritis. This fact the author thinks

is probably due to a change in the staining properties of the spirochetæ during the process of decalcification.

HENRY HEIMAN.

MEDICINE.

Kerley, Charles Gilmore: Incontinence of Urine. (*Boston Medical and Surgical Journal*, August 16, 1906.)

When involuntary discharge of urine, normal in the young infant, persists during waking hours at the completion of the second year or during sleep at the completion of the third year, the condition is abnormal, and in about 10 per cent. of the cases a correctable cause may be found in adherent clitoris or phimosis, thread worms in the rectum, constipation, stone in the bladder, cystitis, undevelopment of the bladder or hyperacidity of the urine. In the remaining 90 per cent. of cases (so-called idiopathic incontinence) the condition untreated is apt to continue to the eighth or tenth year. The mother should be told that for cure, prolonged treatment and her active and continued co-operation will probably be required. Except in inveterate cases the following treatment, untiringly carried out for from four to six weeks, will frequently effect great improvement or cure. No fluid is allowed after 4 P.M., and the child is given a "dry supper." Sleep on the side or stomach is encouraged or enforced. The child is wakened to urinate at about 11 P.M. Kerley believes that belladonna is of great value when given in conjunction with strict observance of the above measures. He uses atropin and pushes the drug to the physiological limit. The author gives practical details as to dosage and administration.

HENRY HEIMAN.

Westcott, Thompson S.: Peculiar Pressure Symptoms Due to Enlarged Tuberculous Bronchial Glands. (*University of Pennsylvania Medical Bulletin*, August, 1906.)

Consulted because of digestive disturbance in an infant three months old, the author noticed that the infant seemed to be uncomfortable when held up in the mother's arms, and that in this position the fingers and hands were slightly congested. A week later, when the baby was held up by the mother, and in certain

other positions with ventral flexion of the vertebral column, there were apparent discomfort and distinct cyanosis of the head, neck and arms. When, however, the infant was laid flat on the bed, the discoloration passed away and the infant seemed to rest more comfortably. Then there developed fever, labored respiration and physical signs in the lungs. The child died when four months old. The diagnosis was pulmonary tuberculosis with enlarged bronchial glands pressing on the descending vena cava. Autopsy showed both lungs studded with miliary tubercles; and at the root of the lungs, in such a position as to press on the descending cava, a mass of tuberculous glands the size of a pigeon's egg.

HENRY HEIMAN.

Torday, Franz: The Rhinitides of Nursing Infants.
(*Jahrbuch für Kinderhk.*, August 8, 1906, p. 273.)

Rhinitis in the newborn may be a primary disease due to infection by vaginal secretions, exposure to draft, or entrance of water in the nostrils at the time of the first bath; or secondary to a constitutional disease. In the young infant coryza markedly interferes with respiration and nursing, and may lead to complications such as bronchopneumonia and otitis media. Gonorrheal rhinitis is usually preceded by gonorrheal ophthalmia. It makes its appearance earlier than a luetic rhinitis, which does not come on for several days after birth. The discharge in the latter is tenacious and bloody. Three forms of diphtheritic rhinitis are described by Zarniko, namely: catarrhal, membranous, and diphtheritic proper. The last is always accompanied by pharyngeal diphtheria, and is usually the most severe type of the disease. The treatment varies according to the cause. In simple rhinitis the author uses tampons moistened with tonogen every three to four hours, for a few minutes at a time. Vohsen advises the blowing out of the nose by means of a tube previous to the use of adrenalin. In gonorrheal rhinitis Torday advises the use of 1 per cent. sodium bicarbonate or 2 per cent. boric acid solution. The author reports 6 fatal cases of rhinitis occurring during the course of several epidemics at the Budapest Kinderasy. Most of the cases showed pure cultures of streptococci. One case developed a streptococcus peritonitis and 2 cases a complicating bronchopneumonia.

HENRY HEIMAN.

Stoeltzner, W.: The Tetany of Children (Spasmophilia) and the Parathyroid Glands. (*Jahrbuch für Kinderhk.*, September 4, 1906, p. 482.)

The author denies that functional disturbance of the parathyroid glands (as claimed by Pineles) is the cause of spasmophilia. He bases his arguments on the following grounds:

(1) Difference in symptoms; in spasmophilia there are no fibrillary twitchings, tremor, tachypnoea, tachycardia, somnolence, and albuminuria, which symptoms are present where the parathyroid glands have been experimentally removed in animals.

(2) Influence of diet; spasmophilia is made worse by the ingestion of milk, whereas in experimental removal of the parathyroids the use of milk lessens the frequency and severity of the attacks.

HENRY HEIMAN.

Stoeltzner, W.: The Tetany of Children. (Spasmophilia) As a Form of Calcium-Poisoning. (*Jahrbuch für Kinderhk.*, June 11, 1906, p. 661.)

The author studied the effects of the different inorganic constituents of milk on the electrical irritability of the median nerve in 12 hospital cases. He found that the addition of calcium chloride or acetate to the food of infants suffering from spasmophilia produced an increased irritability of the nerves and an exacerbation of the disease. The other inorganic constituents of milk, such as sodium chloride and magnesium carbonate, had no such effect. This explains the frequency of spasmophilia in artificially fed infants, as the amount of calcium chloride in cow's milk is five times as great as that in human milk. The frequent occurrence of the disease in rickets is attributed to an increased amount of calcium in the circulating blood, which is not used up in the formation of bone.

HENRY HEIMAN.

Duckworth, Sir Dyce: Chorea Considered as Cerebral Rheumatism. (*British Medical Journal*, June 23, 1906, p. 1,454.)

The association of rheumatism with chorea is now acknowledged to be closer than was the case some years ago. The effects of the toxicity of rheumatism are more widely spread over

the body than on articular or cardiac structures, and thus the throat, the skin and the brain may equally be sites for its manifestations. The author believes that the particular organism termed *micrococcus* by Walker, *diplococcus* by Poynton and Paine, and *streptococcus aus chorea* by Wasserman, is the actual infective and casual agent of acute rheumatism. Chorea is an infection, although a neurotic factor must be acknowledged. It is distinctly more frequent in families prone to rheumatism. The occurrence of chorea may be the sole manifestation of an attack of rheumatism, and it is thus a true cerebral rheumatism. The rheumatic toxin has certainly something specific in its nature, though it varies in the quality and degree of its virulence. The clinical evidence in favor of the rheumatic nature of chorea is stronger than the bacteriological. A further and wider consideration of this question is urged.

A. W. BINGHAM.

Poynton, F. J.: A Lecture on Congenital Heart Disease. (*British Medical Journal*, June 23, 1906, p. 1,458.)

Morbid changes in congenital heart disease may be grouped under two headings:—those due to malformation, and those due to intrauterine endocarditis. In the first group the results depend upon the stage of fetal life at which arrest of development takes place. In the second group of cases—those resulting from intrauterine inflammation, probably rheumatic in origin—are many remarkable examples of fetal endocarditis. Pulmonary stenosis is an important lesion, because this is a form of congenital heart disease in which life is more likely to be prolonged to adult age than in any other.

In infancy symptoms are somewhat indefinite, cyanosis is not always shown, and these infants may be only listless, small and puny. Labored respiration, paroxysms of disordered breathing, with unconsciousness and epileptiform attacks are important, as such attacks may be prolonged and dangerous.

Cyanosis, clubbing of fingers, toes and nose, cold extremities and a subnormal temperature are frequently seen. A harsh systolic bruit, loudest over the pulmonary area and frequently accompanied by a thrill, is usually present, but in the first few weeks the murmur may not be audible. The murmur is sometimes soft and may be overlooked if child is crying. A con-

tinuous humming bruit, lasting through the whole cardiac cycle, rising and falling with the systole and diastole is caused by a patent ductus arteriosus.

Hypertrophy in congenital heart disease is, as a rule, remarkably slight. Arrest of physical development is sometimes a prominent feature, and Mongolian idiocy may be associated with it.

Older children as well as infants feel the cold very much, and prefer to sit hugging the fire rather than warm themselves by exertion, which makes them short of breath. The lives of these cases are precarious and the majority die under two years. Sudden death, pulmonary tuberculosis, acute endocarditis or intercurrent disorders may thus terminate life.

Treatment is palliative. These children must be kept warm, well clothed, well nourished and in as mild a climate as possible. Whenever possible they should be educated. Strychnin is more useful than digitalis. Cod-liver oil, iron and malt are often well borne. For fainting attacks quick stimulants, warm mustard baths and oxygen are of assistance.

A. W. BINGHAM.

Still, George F.: A Clinical Lecture on Infantile Scurvy. (*British Medical Journal*, July 28, 1906, p. 186.)

The clinical picture of fully developed scurvy is striking enough: An infant who has been fed upon one of the patent foods, with or without milk, or on milk which has been condensed, sterilized, or otherwise altered, has been ailing for some weeks, has taken food badly, and probably lost weight. The mother says it cries whenever it is touched, and, as she puts it, "has lost the use of its limbs." There may be some swelling of one or other of the limbs. Any handling of the affected limbs causes a piteous cry, evidently of acute pain. If teeth are present the gums around them are swollen and purple, bleeding readily when touched. The urine is perhaps smoky, if not red with blood. Age is important in diagnosis. In three-fourths of the cases the disease begins between the age of six months and ten months. Rheumatism is practically unknown under eighteen months and is rare under three years. Syphilitic epiphysitis begins most often under the age of three months.

Onset may be insidious; the child is fretful and miserable, takes nourishment badly, fails to gain or loses weight. There is

no swelling of limbs, no definite tenderness, and the gums are perfectly normal, but the condition improves rapidly on antiscorbutic treatment.

The more pronounced symptoms may, however, appear suddenly. Perhaps the most striking symptom is the tenderness of the limbs and loss of movement. This occurs much more frequently in the lower limbs than in the upper. With the tenderness there is sometimes associated some visible or palpable swelling of the affected limb. This is the result chiefly of subperiosteal hemorrhage and may aid in the diagnosis in infants who have no teeth. Loss of movement is often very marked. Edema of skin over swelling occasionally occurs and does not indicate pus. Great swelling and discoloration of the gums is by no means a constant feature. A slight discoloration may occur only on edge of gum behind the tooth. Hemorrhage into the gum does occur before the tooth pricks through, when it is close to the surface. Palatal hemorrhage may aid in the diagnosis in infants who have no teeth and show no gum affection. Orbital hemorrhage is not frequent. Urinary changes are more constant than the gum affection; 88 per cent. showed some change and 60 per cent. showed hematuria. Pyrexia, though exceptional, is not rare. Hemorrhages into the skin, from mucous membranes, or into the viscera, are exceptional. Three out of 54 cases proved fatal from diarrhea or exhaustion. There is sometimes prolonged disturbance of nutrition. Usually antiscorbutic diet will cause definite improvement within four days.

Scurvy is an entirely preventable disease. The diet in this series of 54 cases was: patent food with water, 14 cases; patent food with fresh milk, usually boiled, 18 cases; patent food with condensed milk, 11 cases, and with sterilized milk, 1 case. Condensed milk caused 5 cases, sterilized milk 3 cases, and peptonized and boiled milk each 1 case. Scurvy in these cases was not due to boiling the milk, but to the addition of the patent food. Milk heated to boiling for a few seconds has little tendency to produce scurvy.

A. W. BINGHAM.

Tubby, A. H.: Torticollis, or Wry Neck. (*British Medical Journal*, June 16, 1906, p. 1,387.)

Torticollis means deviation of the head due to spasm, which is either tonic or clonic, of certain muscles of the neck. There

are several varieties of true torticollis. Acute wry neck is an acute rheumatism of the neck, which sets up possibly a certain amount of temporary myositis. It is usually amenable to medical treatment, but it may be the beginning of the more troublesome spasmodic wry neck. Reflex torticollis is due to irritation, which proclaims its effect through the spinal accessory nerve. Causes are enlarged glands, carious teeth or other irritation, which must be removed. Fixed torticollis is due to changes in the sternomastoid and other muscles of the neck. Causes are injuries at birth, especially in breech presentations, and congenital syphilis. Operation may be necessary and the open method should be used. Incision along anterior border of sterno-mastoid is preferable.

The pathology of spasmodic wry neck is not clear, but it is probably due to some form of cerebral lesion, depending upon sclerotic changes in the blood vessels. Several muscles are usually affected. The mind element is important. A neurotic family history is frequent and the spasmodic tic in many cases follows a severe shock. Drugs usually have little effect and, if case is severe, operation is necessary. A portion of the posterior primary branches of the third and fourth cervical nerves should be removed. Cutting the motor supply to the posterior cervical muscles stops the vicious movements, and cutting the sensory supply of the back of the head and neck breaks the vicious reflex circle. False torticollis is associated with spinal caries, and follows cicatrices of burns and wounds in the neck.

A. W. BINGHAM.

Grove, W. R.: A Family Infected with Syphilis:
(*British Medical Journal*, June 16, 1906, p. 1,400.)

A baby, born of a syphilitic mother, developed pemphigus a few days after birth, but recovered. She was then left with the grandmother. Mercurial treatment was not continued more than six months. A year later the baby developed condylomata around the anus and some stomatitis. Two weeks afterward the grandmother came under treatment for a chancre on the lip with an ulcer on the tonsil and indurated cervical glands. This was followed in ten days by a copper-colored rash. About the same time her own daughter, aged twelve years, and her son, aged seven years, developed a similar sore throat and rash. Both the

grandmother and girl had fed the baby with a spoon and had tasted the baby's food with the spoon used by the baby; the boy had not, but he may have used the spoon unwashed. The baby was eighteen months old when she infected the others, and therefore lengthened treatment in these cases is necessary.

A. W. BINGHAM.

SURGERY.

Castellani, Aldo : *Ascaris Lumbricoides as Cause of Appendicitis.* (*British Medical Journal*, August 4, 1906, p. 252.)

A girl of Ceylon, fourteen years of age, had suffered from round worms for a long time and had passed worms on several occasions. She was given santonin. Shortly afterward she had vomiting, pain and tenderness in right iliac region and fever. Two days later she died.

At the postmortem examination a few hours after death, the appendix was observed to be protruding and showed small areas of fibrinous exudation on its surface; there were no adhesions, and it felt hard. On opening the intestine a dead ascaris was found firmly embedded for half its length in the appendix. There was a diffuse infiltration of all the coats of the appendix and the mucosa showed several erosions.

A. W. BINGHAM.

Stevenson, Howard : *Notes on a Case of Fissura Abdominis.* (*British Medical Journal*, August 4, 1906, p. 252.)

The subject was a seven to eight months' premature female child. When seen two hours after birth a large mass of bowel lay exposed outside the abdomen without peritoneal or other covering. The prolapse consisted of all the large intestine and several inches of the small, with a patent Meckel's diverticulum. The Meckel's diverticulum was removed, the intestine returned to the abdominal cavity, the cord was freed from the margin of the fissure, and the fissure, which was between one and two inches

in length, was closed, the cord being fixed in the upper angle of the wound.

The child did well till the sixth day, recovering from the immediate effects of the operation. She then became jaundiced and did not take her food well. She died on the eighth day.

A. W. BINGHAM.

Fisk Arthur L.: Hypertrophic Stenosis of the Pylorus in Infants. (*Annals of Surgery*, July, 1906.)

The author publishes 1 case (not operated upon), and gives a succinct and most serviceable résumé of pyloric stenosis in infants.

The symptoms usually appear in the second or third week. Vomiting is the characteristic sign, is projectile, varies much as to frequency, and no bile is ejected. Gastric dilatation and peristalsis are often visible, and the enlarged pylorus is often palpable. Emaciation comes early and is extreme.

The lesion usually consists of marked hypertrophy of the circular fibres of the pylorus, with nearly complete stenosis of the lumen.

Inasmuch as the true cases of stenosis average to die at nine weeks and a half, surgical relief must be given before great debility and emaciation have occurred.

Pyloroplasty, pyloric divulsion, pylorotomy and gastroenterostomy have been done. Of these methods the choice lies between gastroenterostomy and pyloroplasty, of which Fisk believes pyloroplasty to be preferable, physiologically, anatomically and surgically. It takes less time and involves less exposure and handling of the viscera.

Early diagnosis and early operation are the keynotes to saving life. Mortality varies from 27 to 45 per cent. after operation in a condition otherwise always fatal.

A. S. TAYLOR.

Trendelenburg, F.: Treatment of Ectopia Vesicæ. (*Annals of Surgery*, August, 1906.)

The writer believes the transplantation of ureters into the bowel will be abandoned because of the danger of ascending infection of the kidneys. His own method, which has shown good results, consists in approximating the separated pubic bones by bloody mobilization of the sacroiliac synchondrosis on one or

both sides; and then in paring the edges of the ectopic cleft in the bladder and suturing them. Skin flaps are then mobilized and sutured in front.

Instead of separating the sacroiliac joints by open operation, he suggests the possibility of controlling the growth of the pubic bones by orthopedic apparatus, which by continued moderate pressure should make them come together.

Following this technic he has had several very satisfactory cases, in which complete control, however, was not possible except with the aid of a simple apparatus with a spring pressing on the neck of the bladder. With this aid they were able to retain urine for several hours, micturate voluntarily, and avoid the disgusting odors usually associated with this condition.

A. S. TAYLOR.

Kopetzky, S. J.: The Surgery of the Tympano-Mastoid Region of the Infant and Young Child. (*American Journal of Surgery*, October, 1906, p. 297.)

Kopetzky calls special attention to the differences in the anatomical relations of the external meatus, tympanum and mastoid antrum in the infant as compared to the adult, and notes the resulting danger of opening the cranial vault, damaging the facial nerve, jugular bulb and carotid artery.

The antrum and middle ear are much more superficial than in the adult, and the best landmark is the bony ridge formed by the posterior root of the zygoma, which indicates the level of the roof of the antrum.

Then follows the detailed technic of the simple and radical operations based upon these anatomical relations.

A. S. TAYLOR.

HYGIENE AND THERAPEUTICS.

Keller, Arthur: "Mehlkinder." (*Berliner Klin. Woch.*, September 3, 1906, p. 1,186.)

Keller again calls attention to the danger of the exclusive use of cereals in the food of infants. This is usually due to the carelessness of mother and physician. The latter prescribes the diet for a few days during an attack of acute gastroenteritis, which

the ignorant mother continues to give indefinitely. The condition can be diagnosticated by the marked dryness of the skin, which can be picked up in folds; muscular hypertonicity; apathy, anorexia and cardiac weakness. These infants may appear to be well nourished and have a good color. The prognosis is grave in cases of some duration; and the recovery is always slow.

HENRY HEIMAN.

Sittler, Paul: Duration of Immunity after Injection of Antitoxin. (*Jahrbuch für Kinderhk.*, September 4, 1906, p. 442.)

Seven hundred cases were immunized with 500 units each, of whom one contracted diphtheria thirteen days later, and two six weeks later. Of 212 cases of scarlet fever immunized, 4 contracted a mild diphtheria. The author draws the following conclusions as a result of his studies:

(1) Immunization is most effectual for three to five weeks if the patient is not too frequently exposed to the disease.

(2) Nonimmunized children contracted the disease more frequently.

(3) Catarrhal affections and traumata shorten the period of immunity.

(4) The duration of immunity does not increase proportionally with the increase of the amount of serum above 500 units.

(5) After repeated injections a condition of anaphylaxia appears.

HENRY HEIMAN.

Thompson, A. Hugh.: Errors of Refraction Among Children Attending Elementary Schools in London. (*British Medical Journal*, July 28, 1906, p. 190.)

Out of 21,914 boys and girls between seven and fourteen years of age, 1,732 were examined; 437 were found to have hypermetropia, 389 hypermetropic astigmatism, 400 mixed astigmatism, and 500 myopia and myopic astigmatism.

Of the total number of children who need glasses on this basis about one-quarter need simple convex lenses, and only exceptionally is it necessary for these to be worn constantly. More than half of the children who need glasses at all require cylindrical or

cylindrical combinations. The importance of this is due to the greater expense.

Over one-quarter, or about 370 of all the children, were myopic and required the constant wearing of correcting glasses, because of the tendency of myopia to increase. In very young children myopia exists to a greater extent than has been supposed, and it is important that these cases should not be required to do tasks they are incapable of performing without injury to their eyes.

A. W. BINGHAM.

Adler, Herman M.: The Nitrogenous Constituents of the Feces of Nursing Infants. (*Jahrbuch für Kinderhke.*, July 18, 1906, p. 175.)

In all cases investigated, Adler found the presence in considerable quantity of a proteid which gave a precipitate with acetic acid. Most investigators consider this proteid a casein; but this Adler denies. He found that nucleo proteids gave the same reaction, and that this proteid was present in the feces of starving infants and in those who have not had milk for several days. He found only traces of albumin, albumose and peptone, and only minute quantities of tyrosin in the normal feces. In cases of intestinal catarrh there was some increase of albumose.

HENRY HEIMAN.

Schlesinger, Eugen: The Therapeutic and Symptomatic Value of Lumbar Puncture in Tuberculous Meningitis in Children. (*Berliner Klin. Woch.*, June 18, 1906, p. 838.)

Author observed that convulsions do not occur so frequently after lumbar puncture. He withdraws as much fluid as he can obtain, 50 c.c. and more, and has seen no serious after-effects. After the first few punctures he frequently obtained dry taps. This he attributed to valvular closure of the foramen of Magendie or the foramen magnum. He noticed this more frequently in tuberculous than in other forms of meningitis.

HENRY HEIMAN.

Schefers: Generalized Vaccinia in an Unvaccinated Three-Year-Old-Child. (*Der Kinderarzt*, June 1, 1906.)

A girl three years old, who had not been vaccinated at the proper time on account of chronic eczema, developed suddenly high fever simultaneously with the eruption of numerous pustules. The

face and arms, the greater part of the abdomen and lower extremities were covered with pustules, and the eyelids and lips as well as the forearms were greatly swollen. No pustules were found on the head, the back, or the mucous membranes of the oral cavity. The parents admitted that the sister of the patient had been vaccinated four weeks before the girl had been taken sick. The infection and eruption had been brought about indirectly by playing with the vaccinated sister and subsequent scratching of such parts of the body which were uncovered and easily accessible. The treatment consisted in the bandaging of the child's hands to prevent all scratching, and application of salves. Three weeks later the child had entirely recovered. Three subsequent attempts to vaccinate the child with highly virulent vaccine were negative.

GUS R. MANNING.

Gilbert J. A.: A Choice of Cow's Milk. (*Medical Record*, October 27, 1906, p. 644.)

Gilbert divides his subject in two general heads, viz.: first, a consideration of fourteen qualities considered by the writer to be desirable in a milk to be used as human food; and, second, a comparison of the main breeds of dairy cows, with a view to selecting the breed best adapted to fill these requirements.

The qualities of a good milk are, according to the author: (1) high percentage of solids; (2) good skim milk; (3) large quantity; (4) slow creaming; (5) easy remiscibility; (6) slow churning; (7) small fat globules; (8) slow coagulation; (9) easy absorption and assimilation; (10) good keeping qualities; (11) cleanliness and purity; (12) phlegmatic temperament in the cow; (13) healthy, rugged cow; (14) freedom from disease in the cow.

A detailed comparison on this basis of the various breeds is now made, and the writer concludes that the Holstein cow fulfils most completely all the requirements, except the one demanding a high percentage of solids. Also, in the face of the fact that a milk poor in fat is better for the young growing animal than milk rich in fat, the advantage of high percentage of fat in a small quantity of milk can readily be sacrificed to a low fat percentage in a large quantity of milk when food for infants and invalids is under consideration.

G. R. PISEK.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

FEBRUARY, 1907.

[No. 2.]

Original Communications.

THE IMPORTANCE OF THE ESTIMATION OF THE CALORIC VALUE OF INFANT FOOD.*

BY J. J. THOMAS, A.M., M.D.,
Cleveland, Ohio.

A vast amount of very valuable work has been done within the past few years in the United States in investigating the daily food requirements of the adult. It is probably not too much to say that by far the most valuable and most extensive investigations along these lines have been carried out in this country. It seems strange to me, therefore, that no similar investigations have been undertaken here with reference to the daily needs of the infant.

In a recent article on the dietetics of obesity, A. C. Croftan says:—"For measuring the nutritive value of the different classes of foods, the term 'calorie' has been imported from the realm of physics. A Calorie is the amount of heat that is needed to raise the temperature of 1 kilo of water 1 degree (Celsius). Each article of food, it has been found, in process of metabolism (*i.e.*, of assimilation, oxidative disassimilation and elimination) in the body, generates a definite quantity of heat, or the mechanical equivalent of this heat in labor. . . . It has further been determined that a normal adult requires from 30 to 35 calories a day per kilo of body weight, and that these calories can be furnished by any one or all of the three classes of food vicariously."

If this be true of foods in general, as consumed by the adult, it is no less true of the limited kinds of foods used by the infant. Yet I fail to find any reference to the caloric value of food in any American text or reference book on pediatrics with which I am acquainted. This omission is still more surprising from the fact

* Read before the Academy of Medicine of Cleveland, November 16, 1906.

that practically all German authorities are agreed on the daily food requirement of the growing, healthy infant, expressed in caloric values, or energy quotient, a term suggested by Heubner, the pioneer in this work.

According to Finkelstein, the average breast-fed infant draws daily during the first weeks of life one-fifth of its body weight; from the middle of the first to the end of the second quarter of the first year, one-sixth to one-seventh; and during the latter half of the first year, one-eighth of its body weight. Expressed in round numbers per kilo of body weight, during the first three months it draws 150 c.c.; during the second, somewhat less; and during the third, 120-130 c.c. Expressed in terms of energy quotient (calories per kilo) the requirement during the first three months is 100 calories per kilo, during the second three months, between 100 and 90 calories; during the latter half of the first year the requirement per kilo gradually sinks to 80 or a trifle below. During the first half year, stationary weight results if an energy quotient of only 70¹ is afforded.

A larger supply depends for the most part either upon active breasts which flow easily or upon numerous feedings. An unusually large requirement sometimes originates from an excess of work, as in unusually active children, whose metabolism, according to Heubner, may increase to 21 per cent. above normal. Likewise a greater requirement results from a greater demand for heat production in consequence of a relatively large body surface. For this reason atrophic, and particularly premature, children require 120 calories, or even more, per kilo. These results were obtained from a large number of cases of breast-fed children carefully studied by a number of recognized authorities, whose figures agree very closely.

In regard to artificially fed children, the figures vary within narrow limits, apparently due to the fewer number of cases accurately studied. Heubner is of the opinion that the assimilation of cow's milk requires more work of the infant than breast milk, hence his energy quotient is 120. Czerny and Keller disagree and consider both milks equal in this respect. Finkelstein gives an energy quotient of 90 to 125 (41 to 56 calories per pound), but to

¹ 100 calories per kilo = 45.4 calories per pound.

90	"	"	"	= 40.9	"	"	"
80	"	"	"	= 36.4	"	"	"
70	"	"	"	= 31.8	"	"	"

be on the safe side and to avoid any possible bad effects from overfeeding, he prefers to use the same quotient for breast and cow's milk. The average caloric value of breast milk is considered to be 650 per liter; of cow's milk, 690-700 per liter.¹

The figures given here are to be understood as representing averages, and not as conforming to any hard and fast rule. Naturally, many children will be found to manage very well much larger amounts of food than their energy quotient requires. Whether this is a waste of good material, or not, I am unprepared to say. After all, as Hutchison aptly says, in discussing Chittenden's startling results, "We seek, not the dietetic minimum or maximum, but the optimum." The rules laid down may fairly be considered in the last class.

The application of the methods of estimating energy quotient is particularly easy in the case of artificially fed infants supplied with simple dilutions of cow's milk. The addition of various cereals, malt foods, artificial foods, etc., adds little to the complications since the caloric value of every food used in the infant's dietary has been accurately determined, and the results are noted in tables easy of access. Until quite recently, I knew of no method for readily estimating the caloric value of percentage modifications, although for some time such a method seemed to me highly desirable. The caloric value of cow's milk may be determined by a method suggested by Hutchison in his work on dietetics. This is based upon the caloric equivalent of the fat, sugar and proteid in milk, and while it might be used to determine the caloric value of percentage modifications, this use seems never to have been suggested. While an ardent advocate of the percentage method of feeding universally popular in this country (and only here, by the way), it must be confessed that it is an empirical method which may, however, be made scientific if we add to it the determination of the caloric values of the various modifications.

With the formulas and diagram to which Dr. Moorehouse has called attention, this objection need no longer be urged. Furthermore, the indications for slight changes in the percentages of different ingredients, now based on clinical observation, may be controlled by scientific principles. In this connection I may be pardoned for quoting from the Johns Hopkins Bulletin for No-

¹ Ten ounces of breast milk = 191.3 calories.

" " " cows " = 203.06-206.6 calories.

vember, 1906, part of a review by Dr. Amberg of Dr. Cotton's new work on Pediatrics. He says: "The laboratory modification, as well as the home modification, simply considers how to obtain certain food mixtures, and the relative composition of the food certainly is of importance. But the rules which govern the change of the formulas are not based on scientific principles, but on clinical observation. Further, the modern efforts to obtain a more scientific basis for the feeding of infants are neglected by the author. I need only call attention to the work of Heubner and Rubner and Schlossman in regard to the energy value of food and its significance. Unfortunately, the importance of these subjects has been lost sight of in the mutual admiration so common among American writers, and instead of marching in the vanguard of scientific infant feeding, we, as American physicians, can hardly hold our own in this field of investigation." A hard blow to our pride, this, but the nail appears to be hit squarely on the head.

The estimation of the food requirement of the infant and the caloric value of infant foods is of the highest importance, not only for the purpose of establishing infant feeding upon a scientific basis, but also to guard against that most frequent source of dyspepsia with all its dire consequences—overfeeding.

Finkelstein says that in order to insure an uninterrupted course of nutrition, the amount of food should be confined within those limits which guarantee a physiologic development of the child. Heubner has shown that a larger amount, corresponding to the age, of breast or cow's milk than the maximum drawn by a healthy breast-fed infant does not leave the stomach in two hours as normally, but remains for three hours or even longer, and then has not the original composition, but is much richer in proteid (and possibly fat?). If these large meals are furnished daily and repeatedly, the stagnant residue increases in amount, decomposes and gives rise to volatile acids. The result is that a chyme, charged with decomposition products, is constantly delivered to the intestines. From the resulting painful peristalsis, he concludes that the intestinal wall, especially its nerves and muscles, is morbidly affected, resulting in what we know later as dyspepsia. The damage done by overfeeding occurs more quickly and reaches a higher intensity in artificially fed infants than in breast-fed. Heubner considers this dyspepsia from overfeeding,

quantitative or qualitative, or both, of the greatest importance in the causation of summer diarrheas.

No further proof seems necessary to emphasize the desirability of control estimations of the caloric value of our empirical formulas and the necessity of adapting them to the needs of the infant, as determined by the energy quotient. From estimations made by Dr. Moorehouse of standard percentage formulas, determined only on the basis of the age of the child, it would appear that the daily amounts recommended are greatly at variance with the actual needs of the child, particularly in the early weeks, the most important period in the infant's life. This is a matter of vital importance in our infant asylums, where we have to deal largely with children, who, to say the least, are below par, even though apparently healthy. Where large numbers of children are cared for, the economy of exact estimations is a matter of no little importance, especially where certified milk and Keller's malt soup are largely used.

Since the caloric value of the food, in all probability, is of more importance to the nutrition of the infant than the exact percentage of the different ingredients, it would appear that we have attached too much importance to the latter. If this be granted, then the estimation of caloric values may considerably extend our resources, even to the extent of using simple dilutions of milk with the addition of milk sugar, at least in home modifications, a much simpler and cheaper method than percentage modifications. Nor is our close adherence to the exact percentage of fat in our formulas free from attack. Finkelstein quotes a number of authorities in support of his contention that a high fat content is of no advantage over a low content for the average infant. Indeed, he so dreads the results of a high fat percentage that he does not permit a higher fat content than 2 per cent., at least during the first half year. Salge's recent fascinating monograph on the causation of entero-catarrh, which he assigns to fat indigestion, would appear to support this contention.

I wish to disclaim any merit of originality in presenting this paper. My conclusions have been formed by investigating the methods of German pediatricists as presented in their writings and used, in part, in my own work in this field. My purpose is simply to add another weapon to our armamentarium in our struggles to solve the ever-perplexing problems of infant feeding.

THE DETERMINATION OF THE CALORIC VALUE OF MODIFIED MILK.*

BY GEORGE WILTON MOOREHOUSE, M.L., M.D.,
Cleveland, Ohio.

If "confession is good for the soul" and American physicians generally wished to receive benefit in this way, an admission of ignorance of the caloric requirements of infants would, probably, cause as little chagrin as any confession they might make, since reference to this subject is entirely or practically absent from American medical literature. With this preliminary, the writer will confess that only recently has this matter been brought to his attention, and that the formulas and diagram here given for the determination of the caloric value of milk mixtures are the result of almost accidental acquisition of this knowledge.

In order that work, bodily heat, repair or proper growth of tissues be maintained in the individual, the food administered must be of a certain nutritive value. In the treatment of obesity and leanness, and in the management of many chronic diseases in adults, this fact is appreciated, and although rarely considered in the same way in the management of infants, it must in them be of equal importance. A determination of the nutritive value of a dietary is a determination of its caloric value. The query as to its adaptation to the individual under consideration is answered largely by comparing the caloric value of the dietary with the weight of the individual.

The great number of foodstuffs entering into the dietary of an adult makes the quantitative regulation of this dietary a very troublesome matter, both for physician and patient. As compared with the adult, the determination of the caloric value of an infant's food is a very simple problem to the physician who thinks in percentages in the artificial feeding of infants upon cow's milk, either with or without change in its percentage composition. He knows the amount ordered, and in difficult cases ascertains what amount is actually taken by the infant. He knows the percentage of fat, sugar and proteid in this mixture. From these data he may without too much trouble determine its caloric value. Namely, reduce the twenty-four hour amount to cubic centimeters; 1 ounce is 30 cubic centimeters, or 29.5 to be more exact. Next, determine the number of grams of fat, of sugar

*Read before the Academy of Medicine of Cleveland, November 16, 1906.

and of proteid in the mixture by multiplying the number of cubic centimeters in the twenty-four hour amount by the percentage of fat, of sugar and of proteid. The calories from each constituent may be determined if one remembers that a gram of fat furnishes 9.3 calories and a gram of sugar or proteid furnishes 4.1 calories.

This statement will be sufficient to indicate that set formulas are not absolutely necessary. Those here given, however, simplify the computations greatly, and reduce their number. By their use the results are more accurate than is the ordinary computation of total calories should 30 cubic centimeters be considered equal to 1 ounce. They will have served an additional useful purpose if they help to call the attention of American pediatricists to this important subject.

Let Q = 24-hour amount in ounces.

F = percentage of fat.

S = " " sugar.

P = " " proteid.

A = calories from fat.

B = " " sugar and proteid.

Then, $A = Q \times F \times 2.74$.¹

$B = Q \times (S + P) \times 1.21$.

After having computed the calories from fat and from sugar plus proteid in any milk mixture, a simple addition of these determines the total calories the mixture should furnish, and the division of the total calories by the weight of the child in pounds gives the calories per pound per day.² Having reached this point, we

¹ As in the Bauer formulas for determining the amount of cream, milk, etc., to make definite percentage mixtures, the percentages are treated as whole numbers: 1% = 1., not .01; .25% = .25, not .0025.

² Please note that while most statements concerning calories and caloric requirements make use of the metric system of weights and measures, the English system is adopted in these formulas. However important we may feel the adoption of the metric system to be, we may say with perfect assurance that, at present, and probably for some time to come, the great majority of physicians to whom this article may appeal know the weights of the infants under their charge and order their food only in pounds and ounces. Since the principles involved in the determination of the caloric value of milk mixtures are not complicated to one who is already thinking in percentages, there seems to be no necessity of making them less familiar to many by the use of liters, cubic centimeters and kilos in place of the familiar ounces and pounds. We may further solace ourselves with the knowledge that until the English system is displaced by the metric, the computations necessitated by these formulas are more simple than are those necessary in computing the calories of modified milk in the metric system.

have all that is essential, and it is to be hoped that the additional formulas, and the explanation of the way they were derived, will not confuse in the minds of any the very simple formula just given.

By the use of the following supplementary formulas, a certain amount of labor in computation may be avoided when only slight changes are made in a mixture, the caloric value of which is known.

With no change in the twenty-four hour amount, a change in the percentage of a single constituent increases or diminishes the total calories as follows, when f, s or p equals the difference between the original and the proposed percentage of any ingredient:—

$$(A + B) + \begin{cases} Q \times f \times 2.74 \\ Q \times s \times 1.21 \\ Q \times p \times 1.21 \end{cases}$$

With no change in the percentages, a change from Q, the former, to Q¹, the new twenty-four hour amount, the new total calories equal:—

$$\frac{(A + B) Q^1}{Q}$$

EXAMPLES.

	I	II	III	IV
Q	15	15	15	20
F	2.50	2.50	2.75	2.50
S	5.00	5.00	5.00	5.00
P	0.83	0.75	0.83	0.83

$$\text{I } A = Q \times F \times 2.74, \text{ or, by substitution, } 15 \times 2.5 \times 2.74 = 102.75$$

$$B = Q \times (S + P) \times 1.21, \text{ or, by substitution, } 15 \times 5.83 \times 1.21 = 105.81$$

$$A + B = 208.56$$

$$\text{II } 208.56 - (Q \times P \times 1.21), \text{ or, by substitution, } 15 + .08 \times 1.21 = 1.45$$

$$208.56 - 1.45 =$$

$$207.11$$

$$\text{III } 208.56 + (Q \times F \times 2.74) \text{ or, by substitution, } 15 \times .25 \times 2.74 = 10.28$$

$$208.56 + 10.28 = 218.84$$

$$\text{IV } \frac{(A + B) Q^1}{Q}, \text{ or, by substitution, } 208.56 \times 20 \div 15 =$$

$$278.08$$

The formulas were derived empirically and it may be of interest to indicate how they were secured. In an attempt to compile useful tables from which the number of calories in milk mixtures for any age might be read directly, the number of calories from different percentages of proteid in 10-ounce mixtures and multiples of 10 ounces were computed and placed in a trial table.

It soon became evident that while tables were impractical, simple general formulas might be devised, using the quantity of the mixture desired, the percentages of various ingredients and a third factor, in securing a product which should give the number of calories. Since sugar and proteid have the same caloric value only two multiplications are necessary, one for the calories from fat and another for the calories from sugar plus proteid. The formula for proteid was based upon a 10-ounce mixture containing .25 per cent. of proteid, the caloric value of which is 3 +. If 3 + is chosen for the invariable factor in the formula for proteid the product of Q, P, and 3 + must still be 3 +, since this is the total calories from proteid in the example taken. This necessitates the reduction of both Q and P to 1. Since Q is 10 ounces, $\frac{Q}{10} = 1$; and, since P is .25 per cent., $P \times 4 = 1$. Therefore, the calories from proteid in a 10-ounce mixture containing .25 per cent. of proteid is correctly represented by the formula $\frac{Q}{10} \times (P \times 4) \times 3 +$, which is, by substitution, $1 \times 1 \times 3 + = 3 +$.

Since 20 and 30 ounce mixtures with the same percentage of proteid have respectively two and three times the number of calories contained in a 10-ounce mixture, $\frac{Q}{10}$ provides for any change in the quantity of the mixture; and, since .50 per cent. and .75 per cent. of proteid in any mixture have respectively two and three times the number of calories of a mixture of the same amount containing .25 per cent. of proteid, $P \times 4$ provides for any change in percentage composition, it follows that $\frac{Q}{10} \times (P \times 4) \times 3 +$ is a general formula applicable to any percentage mixture.

This formula may be simplified in the following steps:—

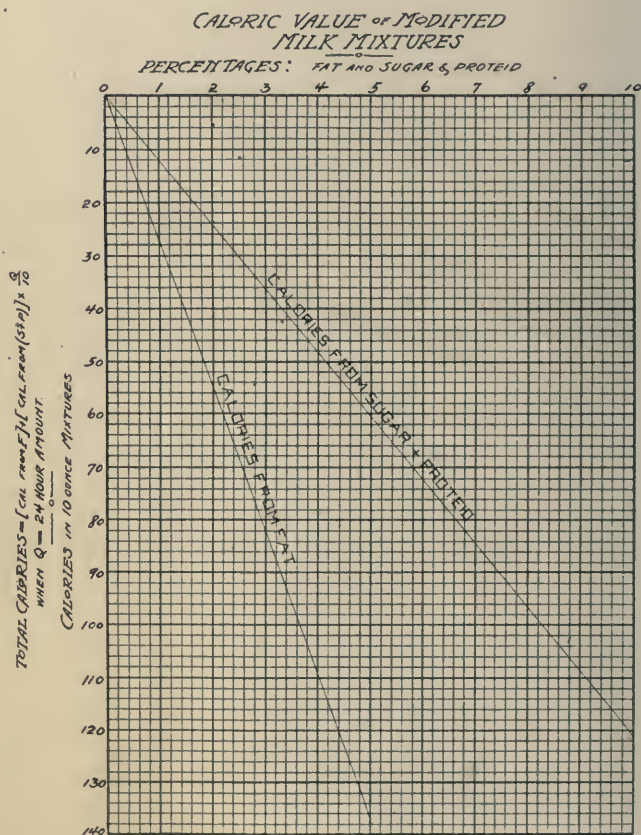
$$\begin{aligned} & \frac{Q}{10} \times (P \times 4) \times 3 + \\ & \frac{Q}{10} \times P \times (4 \times 3 +) \\ & Q \times P \times \frac{4 \times 3 +}{10} \\ & Q \times P \times 1.21 \end{aligned}$$

Since the caloric value of sugar and proteid may be computed together, we have:— $Q \times (S + P) \times 1.21$. The formula for the determination of the number of calories from fat in milk mixtures was secured in the same way.

Computations are so burdensome to some people that a method was sought which should, so far as possible, make them unnecessary. Tables had already been found to be out of the question,

but diagrams showing the calories from fat and from sugar plus proteid in mixtures of any practical percentage composition and in all amounts used in infant feeding may be constructed. They would, however, be too large to carry conveniently, but might be used in office or institution practice.

The diagram which follows is of a size to be carried in the



pocket and was constructed for the calories from fat, and from sugar plus proteid in a 10-ounce mixture. After determining the total calories in a 10-ounce mixture from this diagram, multiply the result by one-tenth the twenty-four hour amount in ounces for the total calories in twenty-four hours. Reasonably accurate results may be secured by the use of the diagram. The maximum

difference in the total calories of milk mixtures, so far as ascertained, when determined both by the use of the diagram and the formulas, was from less than one in small mixtures with low percentages, to three or four in large mixtures with high percentages. Such small errors in the total calories may be disregarded.

In offering a simple method for the determination of the caloric values of milk mixtures, it is hoped that they will prove a valuable guide in the artificial feeding of infants upon modified milk, disregard of percentage modification not being contemplated or advocated. Since the writer has known the supposed caloric requirements of infants,¹ a number of instances have come to his attention in which infants have been gaining upon mixtures deficient in caloric value; and other infants, apparently healthy, have been losing, gaining or remaining stationary, as the case may be, upon mixtures affording a decided excess of calories. For this reason, it may be said that the subject here opened affords a large, easily cultivated and fruitful field for clinical investigation in the artificial feeding of infants.

Fluid Gelatin in Diarrhea.—Mann and Herzberg (*Therapie der Gegenwart*, Vol. XLVI., No. 11) corroborate Cohn's statement that fluid gelatin has an excellent effect in certain cases of diarrhea. If a 10 per cent. solution in distilled water is boiled for six hours and then filtered, the resulting fluid keeps clear and fluid for days. Herzberg has for years ordered a soup made of calves' feet (about one pound to one quart of water, boiled down to one pint), in diarrheal conditions in children and in typhoid fever. It checks the diarrhea while nourishing the patient. In one case severe intestinal hemorrhage was apparently arrested by it. Mann urges further trials of the fluid gelatin in non tuberculous intestinal ulceration. In his experience the persistence of the diarrhea under the gelatin treatment indicated a tuberculous process. Such do not seem to be influenced by it.—*Journal of the American Medical Association.*

¹ In round numbers, the infant under three months of age needs a food which will afford 45 calories per pound each day. From three to six months of age 41 calories are required. In the second half of the first year the caloric requirements drop gradually to 36, and sometimes below this figure. Theoretically at least, no child under one year of age can gain on a food the caloric value of which has been reduced to 30 calories. Marasmic and atrophic infants need about one-fifth more than the amounts here given.

IMPAIRED RESONANCE BEHIND AND BENEATH THE INNER THIRD OF THE LEFT CLAVICLE IN NORMAL CHILDREN.*

BY S. M'C. HAMILL, M.D.,
Philadelphia.

This area of impaired resonance, as I have previously expressed in print, was called to my attention in the examination of cases of bronchopneumonia in which I was endeavoring to elicit signs indicative of enlargement of the bronchial glands.

For a time I limited my examinations to cases of bronchopneumonia and, finding it constantly present without other signs of disturbance in the chest, I was led to look for it in the chests of normal children. The result of such investigation has made it clear to my mind that it exists in the chests of the majority of infants and children in perfect health. It is more difficult to elicit in infants than in older children; it persists throughout childhood, being less common, however, in later childhood than in the early and middle periods.

The extent of the area of impairment varies in different children. In the majority it does not extend beyond the inner third of the clavicle. It can be elicited by percussion of the clavicle and by percussion in the first interspace immediately beneath the clavicle. It sometimes extends as far out as the mid-clavicular line, gradually fading as this point is approached, and in such instances it extends downward, blending into the upper border of cardiac dulness. It is usually better developed when the child is recumbent, although it is sometimes more distinct in the upright position.

The explanation which I have previously offered as the cause of this sign is, that the posterior position of the lung in early life brings the great vessels into more intimate contact with the anterior chest wall. As I have stated elsewhere, this probably does not account for the instances in which the impairment extends as far to the left as the mid-clavicular line, unless it be that the rela-

*Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 31, 1906.

tively extensive area of contact with the solid organs—the great vessels and heart—reduces the elasticity of the chest wall sufficiently to partially deaden the pulmonic resonance for a limited distance beyond the point of contact with these solid organs.

I have called attention to the presence of this area of dulness because it is not described in the text-books; in fact, the text-book teaching has been that the percussion note is somewhat higher pitched under the right clavicle than the left—a teaching which, so far as childhood is concerned, is incorrect. That the presence of this area of dulness is sometimes misleading I have had ample opportunity to determine, not only because I was misled myself, but because I have found others who have misinterpreted it as indicative of a pathological lesion.

DISCUSSION.

DR. JACOBI.—One of the main symptoms of an open ductus arteriosus is dulness along the left margin of the sternum at the upper part, with loud systolic murmurs extending upward into the carotid vessels.

DR. HAMILL.—We made some effort to determine the origin of the impaired resonance by perforating the chest, postmortem, with hatpins, but the only results were that the lung in all the cases assumed a very posterior position, leaving the great vessels very much exposed. I do not recall that the ductus arteriosus was present in such a way as to have been a contributive factor.

The So-called Physiological Hiccough of Infants.—

Thevennet says (*Lyon Médical*, August, 1905) that, in an apparently normal infant, hiccough occurs as a reflex from the stomach, and indicates a surcharged condition of that organ. It may happen because the stomach is particularly susceptible, or because too large a quantity of food has been ingested and has consequently produced distention. After serious digestive troubles, hiccough is an indication that the stomach has resumed its normal functions. Its value as a favorable sign is only relative. Its signification is to a certain degree of the same order as the regurgitation which is also observed in apparently healthy infants which have been fed too much, or irregularly. It indicates at least that a sufficient quantity has been ingested to reach the limit of the digestive capacity of the stomach.—*New York Medical Journal*,

THE SIGNIFICANCE OF ALBUMIN AND CASTS IN THE URINE OF CHILDREN.*

BY FREDERIC E. SONDERN, M.D.,

Professor of Clinical Pathology, New York Post-Graduate Medical School,
New York.

In children, even more so than in adults, the occurrence of albumin in the urine, alone or associated with casts, is not the absolute indication of a nephritis once believed, as we know that its presence does not necessarily indicate an inflammatory lesion of the kidney.

It has been demonstrated to the satisfaction of most observers that a kidney normal in every particular, with normal circulation and innervation, and offered normal blood for the exercise of its function, does not excrete albumin, and therefore the occurrence of a so-called physiological albuminuria is open to question. On the other hand, not only an inflammation of the renal parenchyma in its broadest sense, but also comparatively slight disturbances in circulation, in innervation or in the quality of blood offered the kidney for the exercise of its function, occasion the passage of smaller or larger amounts of albumin in the urine with or without casts. While the evidences presented by the urine in decided acute nephritis and in many cases of chronic nephritis are never simulated by those appearing in consequence of functional and noninflammatory renal disturbances, still the differentiation between the latter and a mild or a quiescent nephritis is very often not possible on the basis of albumin and casts. A complete urine analysis in those cases often lends additional help, particularly as the noninflammatory ones are apt to present elements known as renal irritants or those known to accompany renal irritants. The actual differential diagnosis is occasionally not immediately possible, and at best demands not only repeated examination of the urine, but the closest clinical observation of the physician.

The characteristics offered by the amount of albumin and the variety of casts in addition to the chemical and excretory changes noted in the different forms of nephritis to which children are subject, are matters of common knowledge, to which reference is not necessary, but experience teaches that some of the more unusual occurrences merit mention.

* Read before the New York County Medical Society, December 28, 1906.

An exceedingly acute nephritis with marked oliguria may show a very albuminous urine containing much blood and no casts at all for the first day or so. To differentiate this from a hematuria due to one or other cause is usually easily possible when all clinical and analytical facts are considered, whereas to pin one's faith on albumin and casts would be very misleading.

The occasional absence of albumin, of casts, or of both for longer or shorter time in cases of chronic nephritis, especially during the quiescent periods when climatic conditions are good, must be kept in mind if the condition is not to be overlooked, but the changes in chemical composition do not disappear, and, while not characteristic when occurring alone, always justify further observation before a true renal lesion is excluded.

The amount of albumin and the number and type of casts, while possibly significant at times in estimating the acuteness in a given case of nephritis when comparing repeated examinations, are no guide to the severity of the lesion in general.

Modern research has also demonstrated that a knowledge of the daily excretion of solids or of urea is not an accurate basis for an opinion on the severity of the renal lesion; but, on the other hand, Cabot's view (*Journal American Medical Association*, March 18-25, 1905) that such information has absolutely no value would seem the other extreme. It is well to keep in mind the normal urea-excretion figures:

Children	3 to 6 years,	1 gram per kilo body weight.
"	8 to 11 "	0.7 " " "
"	13 to 16 "	0.3-0.5 " " "

and particularly to note the changes in a given case on the same diet.

While the degree of albuminuria and the casts present are potent factors in the differential diagnosis between pyelo-nephritis and other suppurative conditions in the urinary tract, the balance of the complete urine analysis lends much additional weight.

The occurrence of renal and vesical calculi, as well as of evidences of a nephritis in the newborn, are certainly interesting observations. Considerable experimental work has been done in reference to the excretion of urine by the fetus in utero, the latest efforts I have been able to trace being those of Kreidl and Mandl in the *Monatsschrift f. Geburtsh. and Gyn.*, October, 1904. They conclude that under normal conditions the fetus excretes no

urine, but on impairment of the excretory ability of the mother, the fetus makes efforts to clear its blood by renal action. It would seem to be a subject for fruitful clinical observation to note if the cases of renal or vesical calculi in the newborn are associated with renal impairment in the mother, as a relationship of these conditions would seem as plausible and give food for thought concerning prophylaxis the same as the association of partial asphyxia and cerebral hemorrhage.

The class of cases in which the albuminuria, with or without casts, is due to functional and not inflammatory renal disorder forms an interesting subject for consideration at greater length. While the excretion of albumin seems due directly to changes in the circulation, in the innervation or in the composition of the blood offered the kidney for the exercise of its function, without appreciable renal lesion, it seems a misnomer to call this physiological albuminuria, as in the majority of instances there is a fault elsewhere if not in the kidney, and the term functional albuminuria, as distinguished from albuminuria of nephritis, would seem more appropriate.

Sudden changes of temperature, cold baths, violent exercise, sudden changes in altitude, fright, extreme grief, surgical or traumatic shock not limited to the kidney; anything that suddenly increases or lowers blood pressure, and a host of other causes may be named for transitory albuminuria due to changes in circulation or innervation. In these changes the diagnosis is simple, on account of the short duration of the condition in question and the easy detection of the causative factor in the clinical history.

When the functional albuminuria is, however, due to changes in the composition of the blood offered the kidney for the exercise of its function, or to circulatory disturbances due to lesions of the heart or other organs, the condition is not transitory in the same sense, and these are the cases in which the differential diagnosis between functional and nephritic albuminuria becomes much more difficult. In them the mere consideration of albumin and casts is not sufficient, and, as previously stated, repeated complete analytical results, combined with careful clinical observation, are always necessary, and not invariably successful at that.

It would not be feasible to attempt to enumerate even a large share of the different varieties of cases of this class, but attention should be directed to some of the types which are the most confusing in differential diagnosis.

The albuminuria with or without casts associated with the different types of anemia without circulatory disturbances, and due to the changed condition of the blood only, or to a possible toxin, is often most confusing. In these cases a differentiation of the above from a quiescent nephritis and consequent anemia possibly ascribed to a previous infectious disease taxes the skill of the most astute clinician, and usually demands recourse to every diagnostic aid of which the laboratory investigations form a part.

The albuminuria with or without casts associated with chronic circulatory disturbances, notably cardiac lesions, offers the same difficulties in differential diagnosis to a lesser degree. In these cases it is again true that the complete analytical result obtained from a urine analysis offers much more help than the mere consideration of albumin and casts.

The subject of faulty metabolism as a cause of albuminuria is one which is attracting more and more attention, and deservedly so; for there seems but little doubt that this is the direction in which we must look for the etiological factors of at least one type of nephritis, namely, the interstitial form or chronic contracting kidney.

Cases of cyclic vomiting in children or cyclic appearance of lesions related to the so-called uric-acid diathesis are accompanied by an albuminuria with or without casts. Investigation has shown a faulty nitrogen partition also cyclical in character, the attack corresponding to the time when the fault in oxidation is greatest. The albuminuria is not nephritic in character, but the result of renal irritation, due either to the faulty composition of excretory products or to a hepatotoxin, the nature of which is unknown. When these cases present attacks at frequent intervals and the albuminuria with casts scarcely subsides before the occurrence of the new attack, careful observation is necessary to distinguish them from cases of nephritis with frequent exacerbations, in which however the faulty nitrogen partition is absent, or, at most, present to a slight degree only, not sufficient to lead to confusion.

The demonstration that intestinal autointoxication, intestinal toxemia, or faulty intestinal metabolism, which ever term or view you prefer to accept, is not only the cause of a distinct train of symptoms, and frequently explains otherwise obscure manifestations, but is also the direct instigation of a long-continued functional albuminuria with or without casts, often difficult to differentiate from a true nephritis, is a recognized fact. When it is

recalled with what facility disturbances of the gastrointestinal tract are occasioned in the young, and when it is kept in mind that intestinal toxemia is particularly prone to cause complicating disorders in them, the necessity for early diagnosis of this condition is evident. The clinical manifestations which direct attention to this intestinal toxemia are not within my province, but the laboratory aid in its diagnosis is important, and it is the recognition of a relative excess of ethereal sulphates in the urine. As indoxyl sulphate and skatoxyl sulphate are the varieties most frequently present in excess, a test for this excess should form part of every urine examination. This is a very simple matter and will lead to a recognition of most of the cases, but a direct quantitative estimate of ethereal sulphates and of mineral sulphates is naturally the more accurate procedure, and consequently better for clinical deductions. It is self-understood that a depression in the ratio of mineral and ethereal sulphates, or an excess of indoxyl sulphate in the urine, being accompanying factors only, and not directly concerned in the actual causative element of the symptoms or of the albuminuria when it occurs, may be brought about by other causes, and thus do not necessarily indicate a specific pathological process. While admitting this, their corroborative value in the diagnosis of intestinal toxemia cannot be denied, it being the best available method known at present, in the absence of definite information as to the nature and determination of the actual toxin concerned.

Albuminuria implies the presence of serum albumin in the urine, and the occurrence of other albumins should not be called by the same name, to avoid confusion. The significance of the presence of the derived albumins has not as yet had the attention it deserves, and will probably be found to be a fault in metabolism rather than one of renal impairment.

Most every communication concerning albuminuria leads to a discussion of the methods for its detection, and the variation in the opinions expressed is due to the fact that no single test exists which is free from error when applied in routine analysis of urine, a fluid so complex in composition.

Two methods of detection and differentiation should always be employed, and they should be selected so that the same error cannot occur in both with any specimen, and that Bence-Jones albumin shall not be overlooked.

SCARLET FEVER OR FOURTH DISEASE (FILATOW-DUKES), WHICH?

BY H. ILLOWAY, M.D.,

Formerly Professor of Diseases of Children, Cincinnati College of
Medicine and Surgery, &c.,
New York.

In the year 1900 Clement Dukes, in an article published in the London *Lancet*,* described for us what, for want of a better name, he termed the "Fourth Disease." Dukes holds that what had hitherto been regarded as rubella scarlatinosa (scarlatinous German measles) is not rubella, is not scarlatina, but a distinct and separate entity.

Though quite a number of gentlemen both of this country and of Europe have discussed the subject, and some, as Weaver† and Unruh,‡ have strongly supported the contention of Dukes, it is nevertheless still *sub judice*, and we have so far not had a positive authoritative expression one way or the other from those whom large opportunities for observation should render competent to do so.

And still, beside its strictly scientific interest, it is a question of great practical importance, not alone in the matter of prognosis, not alone in the matter of treatment, as can be readily understood, but also and still more as to the matter of *isolation* (leaving out of consideration, as Dukes says, the anxiety, the matter of expense for nursing, etc.). If the fourth disease, as Dukes maintains, then according to him a sequestration of fourteen days and disinfection at the end of that period amply suffice, whilst we know that for scarlet fever forty-two days or six weeks are an absolute requirement.

Moreover, it is not always a question as to the patient alone. Not infrequently it becomes a momentous issue for those in moderate circumstances. I have personal knowledge of an instance where such a period of isolation broke up a good paying business that the mother of the patient had been conducting, and she was never able after that to reestablish it.§

**The Lancet*, July 14th, 1900.

†*Journal of State Medicine*, 1901.

‡*Deutsches Archiv f. Klinische Medicin*, Bd. 85, H.1. 1905.

§How important this question is can be readily seen from the efforts at concealment of infectious diseases made in many instances, and from the pressure brought to bear on the family physician not to inform the Health Officers.

It is true that a reading alone of the differential symptoms as set down by Dukes is not very convincing; in fact, it leaves the impression that he is differentiating merely between a mild and a severe type of scarlatina. Nevertheless, there can be no doubt that a personal experience with such cases, personal observation of the marked contrast they present to true scarlet will incline one to give Dr. Dukes' statements very careful consideration.

It has, therefore, seemed to me that the reason for this lack of authoritative expression is that these cases are of uncommon occurrence, and that no one has seemingly had a sufficient number thereof to enable him to arrive at a conclusion pro or con.

In a long practice, extending over a period of thirty years, I have seen 4 cases (leaving out of consideration mild cases of unquestionable scarlatina) in which the question, scarlatina or fourth disease, which? could be properly raised.

They were three children and one adult.

CASE I.—May 15, 1883. Harry H., act. 4 years, a stout, fat little boy. I was called to see him in the afternoon. Found him in bed. The mother told me the child had not felt well the evening before; seemed a little feverish and did not appear to have any appetite for his supper; he drank his milk, but did not eat anything. He was put to bed shortly after and, though a little restless, on the whole he slept fairly well. The next morning, about 6 A.M. (the family rise early, as the father goes to work), he got up and said he felt all right; drank his milk, but ate very little of his slice of bread and butter. When asked why he did not finish it, he replied that he was not hungry. About 10 A.M. he complained of feeling tired and wanted to lie down. The mother felt his forehead and his hands, and noticing that they were warm she took off his clothes and put him to bed. His bowels had acted that morning.

As he lay there he appeared to be in a drowsy, somnolent state, and had a slight flush on his face. He answered all questions readily, and at intervals would brighten up for a moment. His tongue was covered with a thin white coat. His pulse was very rapid. His temperature 103° F. (axilla). Examining his body, I found numerous small bright red dots, some round, some crescent shaped, others rather irregular. There were some upon the arms, but none upon the lower extremities. I passed my hands over them, but did not detect any elevation above the level of the skin.

I looked into the throat and, except that it seemed slightly congested, I did not find anything out of the usual. There was no cough, not even a hack.

Diagnosis reserved.

As there was nothing particular to be done, I contented myself with prescribing the following cooling mixture:—

R Liq. Ammon. Acetat. recent praeeparat. . . . 5v
Tinct. Aconit. Rad. gtta ii
Syr. Aurantii florum. 3iij

M: Sig. Keep cool. Give one teaspoonful every two hours.

To have cool weak tea with much milk (of which he is usually very fond) if he wants it, and a cooling drink of water at proper and sufficiently frequent intervals.

May 16th.—The little fellow was very feverish and very restless in the night. He has urinated twice since yesterday afternoon and each time a fair quantity. Temperature 104° F. (axilla). The whole body is now covered with a bright-red scarlatinous rash, on the legs down to the knees, and on the arms nearly down to the wrists.

On the legs from the knees down to near the ankle the bright-red dots are very numerous. I looked into his throat and, except the slight redness already referred to, saw nothing abnormal.

The treatment as directed yesterday to be continued. In addition directed a quinin chocolate tablet, 1 grain, to be given every four hours.

9 P.M. The rash has extended down the legs to the feet. Temperature 104½° F. (axilla).

May 17th.—The little patient is much brighter. He took a cup of milk, asking for it, shortly after midnight, and one this morning. Temperature 103° F. Nothing in the throat. Looking over his body, I found the rash still there, but a shade paler than yesterday.

Continue same treatment.

May 18th.—The patient is quite lively this morning. He slept well the whole night. He awakened at about his usual hour, and at once asked for his breakfast. Drank a cup of milk and ate a slice of bread and butter. Temperature 100.5° F. (axilla). The rash very much faded. Micturition normal.

May 19th.—Temperature normal. Rash all disappeared. Hard work to keep him in bed.

Though the sudden and rapid conclusion of the case seemed rather to upset my diagnosis of scarlet fever, I nevertheless held thereto as a matter of precaution, and told the mother that she must keep the child in the house for some weeks, not expose him to draughts, and not give him anything but the blandest food, milk, milk with tea, oatmeal gruel with milk, and bread and butter; after three or four days more, and all is well, a soft-boiled egg twice a day. No meats; no soups (of meat).

Desquamation followed; not as in scarlet fever, where the skin peels off in patches large or small, but a fine furfuraceous desquamation (like dandruff), as is seen in measles.

After three weeks, the child being apparently perfectly well, eating and drinking and performing his other functions, and desquamation completed since a week, and the weather being very warm and dry, I allowed him to go out.

CASE II.—Robert H. (brother of Harry), aet. two and one-half years; a well-developed, chubby little boy. On the 22d (three days after my last visit to his brother) I was called to see this baby.

The history of the case was in all its features the analogue of the preceding one. The red dots, followed in twenty-four hours by a scarlatinal rash, which lasted for forty-eight hours and then rapidly faded. No throat trouble at any time. Desquamation following, same in character as in the case of his brother; furfuraceous, like that usually seen in measles.

CASE III.—March, 1893. B. S., aet. twenty years. Five feet five inches in height; a well-developed young man. Paperhanger. Lives at home with his parents; a very good boy; not wise in the ways of young men.

I found the patient in bed. He had not been feeling well the last two days, but felt worse to-day and could not go to work. Has no appetite; his tongue is coated. Temperature $101\frac{1}{2}^{\circ}$ F. (axilla). Looking at his body, I found it presented a peculiar eruption—small, rather dusky red spots, some round, some circular.

Fauces and pharynx, with the exception of a slight congestion, nothing abnormal thereabouts. No catarrhal manifestations.

Though the eruption looked very much like the outset of rubella, and to my mind that was the diagnosis, I nevertheless re-

frained from making any positive statement to the family. He was to stay in bed, have a light diet—milk, milk with a little tea, oatmeal gruel, bread, with cool water to drink at proper intervals. As to medication, I prescribed a mild diuretic, diaphoretic and refrigerant mixture.

The eruption continued thus, presenting the same appearance and without any other change than that it covered more of the body for five days. On my visit on the sixth day, on looking at his body (chest), I noticed that the punctate eruption had disappeared, and in its place was the rosy rash of scarlatina. On the arms the puncta were still to be seen. On the following (the seventh) day the whole body was covered with the scarlet rash.

The temperature also rose, and it ranged now from 103° to $103\frac{1}{2}^{\circ}$ F. in the morning to 104° to $104^{\circ} +$ F. in the evening.

No further involvement of the throat; it remains as described. He complains very much of the itching and burning of his skin. For this, application of bacon-rind to the body.

Treatment same as before directed.

The rash remained out, full, for a similar period of five days, and then began to fade gradually, slowly, and it was fully three days more before it had vanished altogether.

Desquamation now set in, at first, as is usual in scarlet fever, small patches of skin coming away. Then, in three to four days, it increased in severity; large patches of skin came loose and away, left the cutis denuded and caused the patient great suffering.

It taxed all my knowledge to supply dermal applications to relieve the great pain. After the lapse of a week the process of desquamation seemed to become arrested, the epidermis began to take on a natural appearance, the pains ceased and the patient lived up again.

For a week everything went well; then again exfoliation set in, and with it the great suffering experienced before. I now called in Dr. Ravogli, the specialist for dermatology, to aid with his superior knowledge in the treatment of the case.

The process again continued for a week, causing much pain and requiring extensive local dressings of soothing unguents for amelioration. At the end of that time it again seemed completed and the patient began to rally and to feel as if life were worth living.

After some days of comfort and ease another recrudescence of

the exfoliative process. It was treated as the preceding one, with the kind aid and counsel of Dr. Ravogli.

At each of these periods it was another part of the body that was involved in the process. In the first period it was the abdomen and the genitals; in the second period the legs, and in the third period it was the back.

With the setting in of each of these periods the temperature would again rise and range from 101°F. in the morning to 102°F. in the evening.

After the last paroxysm there was no further relapse; the patient began to mend quickly, and was soon on the highroad to health.

June 1st.—He is still in bed, weak, but able to eat and rallying nicely. As I was about to leave for Europe, I transferred him to the care of a colleague, who informed me on my return that he had kept the patient in bed for about two weeks and then allowed him to get up. There had been nothing further of note in his history.

CASE IV.—April 18, 1903. Barbara S., aet 12, a girl rather tall for her age. Very slender, goes to school and is quite bright.

About 10 P.M. on the date above given I was called to see her. Her mother said she had come from school complaining of not feeling well and of headache. She remained up, however, and took a light dinner (6 P.M.). Later in the evening she became feverish and was put to bed. About 9 P.M. she complained of feeling sick, and shortly thereafter began to vomit. She threw up part of her supper and water. She vomited twice.

When I saw her the nausea had disappeared and she felt relieved as to her stomach. She looked feverish, face flushed, eyes somewhat suffused, and although evidently very drowsy, answered correctly and intelligently. Temperature 101° F. (axilla). Scanning the body, I noticed small puncta, rather purplish in color, some round, some crescent shaped, others irregular, scattered over the chest, the arms and down on the abdomen.

As the child had occasionally had such spells of indigestion attended with rise of temperature, which would be rapidly relieved, I contented myself with prescribing a pleasant cooling and diaphoretic mixture. To have an enema in the morning. To keep her in bed to-morrow, feed her lightly milk or milk with a little tea (for a change) and a little dry toast or zwieback, and if noth-

ing especial occurred, I would see her day after to-morrow; otherwise I was to be informed at once.

It was a question with me whether there was merely an indigestion with a rash or the beginning of an attack of measles, although no catarrhal symptoms had been noted. However, as she had already had measles normally, and as a second attack is a rather infrequent occurrence, and in view of the absence of catarrhal manifestations, I inclined to the former view of the case.

April 20th.—1 P.M.—Patient is bright and talkative; says she feels good. Temperature $101\frac{1}{2}^{\circ}$ F. (axilla). The puncta have disappeared from the body, and in their place there is a bright scarlet rash. On the arms the puncta are still to be seen. Asked as to her throat, she said it was all right. I looked into it and saw nothing out of the normal; possibly slightly redder than usual.

The question of diagnosis again came up; but, without entering upon any discussion with myself, I told the parents the child had a scarlet rash, which might very likely be of the nature of scarlet fever, and suggested that a pediatricist, an eminent colleague, be called in, as the case lay out of my present sphere of medical practice. As it was after hours, and furthermore as the father, who would not be home till late, should be consulted, I was asked to prescribe again for the child.

The further history as imparted to me by the mother was as follows:—

The following day (21st) the pediatricist was called. He found the child doing nicely, and continued the previous treatment. The next day (22d) temperature normal and the rash all faded. The following day (23d) she was out of bed.

She was kept under observation for some time, her urine examined at stated intervals, and she was kept in the house for six weeks.

The desquamation was on the whole of the character described as furfuraceous, just as in Cases I. and II., and was soon over.

The whole history of the case from beginning to end was uneventful.

Studying the cases together, we find that they have these special features in common:

- (1) All the cases occurred in the spring of the year.
- (2) In all the eruption at the outset presented the small red

puncta; in Cases I. and II. brighter, in Cases III. and IV. darker.

(3) The absences of that rather marked general prostration, the being sick, which is so notable a feature in scarlet fever. Even in Cases I. and II. the very young children, whom high temperature affects more markedly, were immediately on the *qui vive*, as one might say, as soon as the temperature had fallen from 104 to 102° F.; and even Case III., which was of rather long duration, the patient appeared and felt sick only during the periods of desquamation, when he suffered great pain, as already told.

(4) Except for a slight and very transitory congestion about the fauces, total absence of all throat symptoms.

(5) The shortness of the duration of the ailment in the cases of the three children.

(6) The branny character of the desquamation, which was quickly over with in the cases of the children.

(7) Though no special examination was made in the first 2 cases, it can nevertheless be said, as there were no manifestations to the contrary in the subsequent years, that the kidneys were unaffected. In Cases III. and IV. repeated examinations failed to show anything abnormal.

I am not certain that Case III. should be put into the same category with the three other cases. However, it possessed the principal characteristic common to all the others, namely, the puncta, and for this reason was grouped with them.

Comparing this résumé with the table of distinctive features of the fourth disease given by Dukes in the article referred to, it will be found that we have here the most prominent features of that table; only some minor incidents are lacking, either because they could not be ascertained (as periods of incubation, site where eruption first appeared), or were overlooked (as peeling of tongue on fourth day, glandular enlargement).

As to the difference in appearance of the puncta, a reading of various observers, Dukes, Weaver, Filatow and others, will disclose similar differences in the observations recorded.

Already a number of years before the appearance of Dukes' article, Filatow had noticed the peculiarities of this what to him is rubeola scarlatinosa, and which he defines "as an independent, acute, infectious and contagious disease characterized by an eruption like that of scarlet fever, but differing from the latter in the

almost invariable mild course and chiefly in the peculiarities of the contagium.

In his "Vorträge über Infektionskrankheiten im Kindesalter," he relates a series of cases occurring in one family, their relatives (two cousins), and a governess (who had had scarlet fever in childhood), which are the analogues of the cases reported here, and which he looked upon as scarlet fever until two years later, when, during an outbreak of the disease, some of these children were attacked by it, and this time in unmistakable form. He then changed his diagnosis and held it to be rubeola scarlatinosa.

This change of diagnosis he based mainly on this, that he holds that a second attack of scarlet fever even in a mild way is not likely to occur, and still less likely to do so within a year or two.*

Bokay,† reviewing the subject, after stating that he has had cases that answered fully to Dukes' contention, concludes his paper with this, that we will not be certain of the existence of a fourth disease, a distinct morbid entity, until it shall have been demonstrated in a sufficient number of cases that persons who have had the so-called fourth disease are not immune to scarlet fever or to Rötheln (German measles, rubella), and that children who have had scarlet fever or rubella are not immune to the fourth disease.

If we accept Bokay's conclusion as correct, then part of this criterion has been found, namely, that children who have had the so-called fourth disease can take scarlet, and again in the person of the governess that persons who have had scarlet fever can take the fourth disease.

But there is another and very pertinent question that presents itself to us, and that is this: If we reject the existence of such an entity as the fourth disease, as do Williams, Crozer Griffith and others, are we to look upon these cases observed and reported by various clinicians, as rubella scarlatinosa, with the definition attached to the same by Filatow, or are they to be regarded simply as cases of very mild scarlet and to be treated in all respects as such?

1113 Madison Avenue.

* Deutsche Mediz. Wochenschrift, October 20, 1904. Article by Bokay.

† Ibid.

ACUTE ALCOHOLISM IN CHILDREN, WITH REPORT OF TWO CASES.*

BY S. W. MOORHEAD, M.D.,
Philadelphia.

I desire to thank Dr. J. P. Crozer Griffith for permission to report the following cases:

The patients, two brothers aged five and seven years, were brought to the University Hospital unconscious at midnight Saturday, September 22, 1906. No history could be obtained except that they were found unconscious in a room with a man apparently in a drunken stupor.

Both patients were slightly cyanosed. The older boy's temperature was 95° F., and the younger's 96.8° F., which subsequently fell to 95.6° F., in spite of the employment of artificial heat. The pulse of each was rather soft, but the beats were full and regular. The pupils were widely dilated, reacting but slightly to light. Both boys resisted the passage of the stomach tube, and the elder vomited a small amount after it had been withdrawn. The washings, vomitus and breath of both patients had the slightest possible odor of alcohol. The following morning the odor of the breath of each was much stronger and quite unmistakable. Magnesium sulphate, introduced by the stomach tube, caused vomiting in both boys.

In the morning they were conscious and talked a little with the nurses, but were somewhat stupid. The younger steadily improved and was discharged cured the following day. The older, after being semiconscious for about an hour, became again unconscious, and shortly after had a general convulsion. A few minutes later, after an interval of quiet, his arms and legs began again to move convulsively, the spasms continuing intermittently till evening. Sometimes he would raise himself on his elbow and gaze at a table or chair as though it were a fearful sight, and his lips would form an "Oh!" which he did not utter. For the most part the legs were quiet, while the arms moved in an athetoid manner, his general appearance reminding one of cerebrosplastic palsy with idiocy.

He was given sodium bromide, gr. xv., by the mouth, and an attempt was made to get him to take water, but swallowing was very imperfect and the fluid seemed to lie in the back of his

* Read before the Philadelphia Pediatric Society October 9, 1906.

pharynx, while coarse rales were heard in the lungs. Hypodermoclysis was, therefore, resorted to, and eight ounces of normal salt solution were rapidly absorbed. Catheterization was not resented and did not provoke convulsions. Examination of the urine failed to show albumin. Microscopically there were a few hyalin, and more numerous narrow, pale granular casts.

While the convulsive movements became less as the morning advanced, the heart failed rapidly, and at 11 o'clock he was cyanotic and his respirations were almost of the Cheyne-Stokes type. He was given strychnin sulphate gr. $\frac{1}{60}$ and camphor gr. $\frac{1}{2}$ in oil, hypodermatically. The pulse rapidly improved, but the convulsions became decidedly worse, and at 3 o'clock there was marked opisthotonus. The convulsions were not extremely severe, and there was no locking of the chest or cyanosis. Between convulsions relaxation was complete, but the head remained retracted and efforts to straighten it resulted in fresh convulsions. Chloral gr. v. and sodium bromid gr. xxv. given by the bowel seemed to lessen the frequency of the spasms, but they did not entirely cease till after morphiin sulphate gr. $\frac{1}{16}$ and atropin sulphate gr. $\frac{1}{150}$ had been given.

His temperature rose steadily all day, reaching 103° F. at nine o'clock in the evening. Respirations and pulse were also increased in frequency. On admission the pulse was 100 and the respirations 18 to the minute. They reached their maximum at two o'clock in the afternoon, being at that time respectively 164 and 36.

The next day, Monday, he was restless and irritable, crying out when disturbed and resisting all handling. In the afternoon he spoke a few words, answering questions sensibly. Tuesday he seemed to understand what was said to him, and answered questions occasionally. Urine and feces were voided involuntarily. Toward evening his pulse became quite irregular and at times intermittent, and he was more restless. At midnight, fifty-three hours after his last convulsion, he suddenly straightened himself out and worked arms and legs slightly for a couple of minutes. During or immediately after the convulsion he voided urine and feces. A more severe convulsion occurred at 2:40 A.M., and a slight one at ten o'clock. He remained unconscious till late in the afternoon, when he began to nod his head in answer to questions. His temperature, which had been normal for the past forty-eight hours, began to rise at 9 A.M., and twelve hours later reached 102.2° F. It then dropped rapidly to normal. Pulse and

respirations did not become more rapid, but the pulse was much weaker and more irregular than it had been on Tuesday.

On Thursday he was decidedly better, but had curious hallucinations of sight and hearing, saying that he saw boys walking on the wall and that the baby in the next bed to him would not stop cursing. On two occasions he said there were rabbits in his bed. The hallucinations completely disappeared in a couple of days, but for a week his mind was far from normal. Frequently in the midst of conversation he would make remarks upon some totally foreign subject, or break out into loud, silly laughter.

His previous medical history is good, having had no disease but chicken-pox, and never having had a convulsion. There is no family history of epilepsy or other nervous or mental disease. Both father and mother drink rather heavily. So far as could be learned, he had never before drunk alcohol in any quantity, but had had it offered to him repeatedly by his father, and had frequently tasted both beer and whiskey. For the past year he has smoked cigarettes when he could get them.

Though he did not enjoy school, he got along fairly well, and was promoted with his class. His teacher says she never noticed any signs of mental deficiency.

The exact quantity of alcohol taken is uncertain, but it could not have been large, probably not more than half an ounce. The younger boy vomited some hours after drinking. They had secured the whiskey about eight o'clock, four hours before their admission to the hospital.

Recovery in both boys is now complete.

Acute alcoholism in children is of quite frequent occurrence in hospital practice, especially in Europe. The most constant symptom is loss of consciousness. This may ensue either immediately after taking the alcohol or after an interval of several hours, the period being as a rule shorter when large quantities are taken.

The period of unconsciousness varies from a few hours to several days, and it is said by certain authorities to weeks and even months. For example, Dr. Herter (*N. Y. Medical Journal*, November 7, 1896) reports a case of a child three and one-half years old who was more or less stuporous for over two months after drinking twelve ounces of whiskey.

The body temperature is subnormal in almost all cases. That this is not dependent upon exposure is well shown by the younger boy, whose temperature fell more than a degree after admission. Temperatures above normal are reported, but as a rule they are

in cases seen late, as in one reported by Dr. Musser (*Philadelphia Medical Journal*, 1880) with a temperature of 103° F.

Convulsions are not so frequent as stupor and subnormal temperature. They may be either clonic or tonic in character. In the more severe cases opisthotonus is present. In his essay on "Epilepsy," published in 1890, Dr. Hobart A. Hare, speaking without special reference to children, mentions epileptiform convulsions following a debauch, and also epilepsy occurring in chronic drunkards.

Neuritis is a much less frequent sequela. In the case reported by Herter, previously referred to, there was right-sided paralysis, most marked in the arm. Later extreme contractures developed, especially on the left side, followed by muscular atrophy in upper and lower extremities, and marked hyperesthesia. Preceding the neuritis there were repeated general and left-sided convulsions. Recovery in this case was complete.

True delirium tremens is rare in childhood. Dr. T. M. Madden (*The Lancet*, September 6, 1884) has reported a case occurring in a boy of eight years, who had drunk the greater part of a bottle of port wine. The delirium was preceded by marked coma.

One of the youngest children in whom alcoholic convulsions have been noted is reported by Dr. Vernay (*Lyon Medical*, 1872, Vol. XI., p. 440). After the fifteenth day the child was breast-fed by a wet nurse, who, it was afterward learned, drank considerable alcohol. In the second month the baby began to have convulsions. He was irritable, trembled and shook at the least noise, and had general hyperesthesia. The convulsions were general, and during each the respiration was suspended for about ten seconds, the body becoming cyanosed. The convulsions ceased shortly after the alcohol was withdrawn from the nurse's diet. (The discussion of these cases will be found on page 137.)

Arteriosclerosis in Children.—Oppenheimer reports (*Virchow's Archiv*, Vol. CLXXXI., No. 2) 2 cases of arteriosclerosis in boys of nine and ten. In the first the child succumbed to a spontaneous rupture of the aorta. High blood pressure and a possible congenital weakness of the wall of the artery were the cause of the affection in the first boy, but in the second it was undoubtedly of toxic origin. The pathologic anatomic findings in each case were those of typical arteriosclerosis.—*Journal of the American Medical Association*.

WHOOPIING COUGH: ITS TREATMENT BY AN IMPROVED ABDOMINAL BELT.*

BY THERON WENDELL KILMER, M.D.,
New York.

Since writing my first paper some three years ago upon the treatment of pertussis by means of a slightly constricting elastic abdominal belt, there has been ample proof by the many cases recorded to date that by this method about 95 per cent. of cases are positively benefited. This is especially true with regard to the cessation of vomiting.

The first belt, as many of you know, was composed of a long strip of silk elastic webbing placed over a stockinette band; this, while efficacious, was nevertheless warm to the child and expensive to the parents. The new belt to which I call your attention this evening is made of linen with a strip of silk elastic webbing

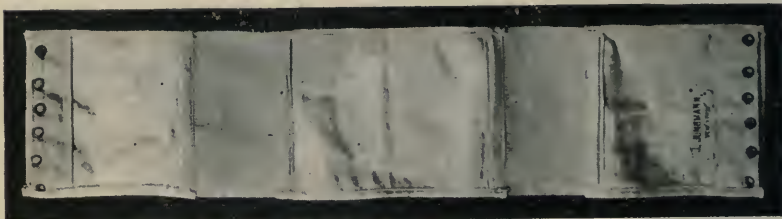


FIG. 1. BELT FOR USE IN WHOOPING COUGH.

two inches wide, inserted on either side. This is sufficient to give the belt elasticity, yet does not add materially to its weight. The belt laces in the back and, by means of the lacings, any degree of constriction may be maintained; it is worn over the undershirt or band. The width should approximately be as follows:—

For infants:—4 to 5 inches wide.

For children:—5 to 8 inches wide.

The length of the belt should be such that when complete it should measure three inches less than the circumference of the abdomen at the navel. The degree of constriction should be determined in each individual case; usually a slight degree of constriction is sufficient to produce a moderation of the cough and a complete cessation of vomiting. If, after having applied the belt, the symptoms do not abate, tighten it slightly.

* Read before the Section on Pediatrics, N. Y. Academy of Medicine, November 8, 1906.



FIG. 2. BELT APPLIED.



FIG. 3. BELT APPLIED AND LACED.

A sense of comfort is generally expressed by children who are old enough to make themselves understood. These belts can be made by any instrument-maker at a few hours' notice; the usual mode of procuring them in any individual case is to send the measure of the circumference of the child's abdomen (at the navel) to the instrument-maker; also stating the age of the child, and in twenty-four hours' time a belt is ready for application. The belt is best applied by the attending physician, and the parents and nurse should be instructed in its use.

The cost of these belts is nominal, from \$1.50 to \$3 being charged for their making. In dispensary cases and where the parents cannot afford the belt, I have used an ordinary muslin binder, and although this is not as elegant as the belt, the results are very satisfactory.

165 West Eighty-fifth Street.

The Strenuous Life of School Girls.—Northrup utters a protest (*Boston Medical and Surgical Journal*, January 6, 1906) against the forcing methods of modern pedagogy. Each spring there is a resulting crop of neurasthenic girls, worn out by school work. The girls are all anxious to be at the head of their respective classes, overstudy, hurry their meals, or go without breakfast altogether, and naturally soon become wrecks. Teachers have little mercy on their pupils, who are goaded to tasks far beyond their powers, and the worst of it all lies in the fact that all this strenuous endeavor is made just at a time when the girl is becoming a woman and entering on her menstrual life. As contributing to unstable nerves, there comes a sequence of impaired digestion, imperfect evacuation of the lower bowel, and an autotoxemia, with all of its injurious effects on the system at large and especially the nerves. The author renews his plea for the establishment of roof-gardens on city houses. Children must be made to go to bed early. Indiscreet remarks should not be made at the breakfast table by the parents. We should instruct teachers as to the absolute necessity of fresh, cool, circulating air in the schoolroom, and help the girls by kind advice and proper supervision throughout the school year. We must reckon with their ambition, foster it and not kill; guide it and not thwart it, and work together to aid the child to begin and to end its year aright.—*Medical Record*.

Clinical Memorandum.

A CASE OF MENINGOCELE.

BY JOHN R. WELLINGTON, M.D.,

Attending Surgeon, Children's and Casualty Hospitals, Washington, D. C.

R. M., female, white, age four months, admitted to Children's Hospital, D. C., October 9, 1906. Father and mother both living and in good health; no brothers or sisters; family history nega-



tive; no previous illness; birth normal, labor of short duration; baby has been breast-fed and apparently healthy.

Present illness: At birth a small tumor was to be seen just below occipital protuberance about the size of a walnut, soft compressible, and apparently filled with fluid. Occasionally fluid would entirely disappear from tumor, leaving a flabby sac. Tumor grew rather slowly at first, but for the last month has increased in size very rapidly. The child appears normal in every other way. On admission examination shows tumor in occipital region, which is very tense; the skin over it is drawn very tightly; in fact,

seems ready to burst at any moment. The tumor had the following dimensions: greatest circumference, 11 inches; circumference at base, 9 inches. The upper part of the tumor is free from hair, which is quite abundant near the scalp. The fontanelles are open and quite tense.

Operation.—Light chloroform anesthesia; crescentric-shaped flaps were dissected from the anterior and posterior sides of the tumor down to the base, care being taken not to cut the sac. An aspirating needle was then introduced, and sufficient of the fluid was allowed to escape to permit the application of a long clamp to the base of the sac, when the whole sac was removed. A double row of continuous catgut sutures was introduced and the clamp removed. Practically no fluid escaped except through the aspirating needle. The skin was closed with interrupted silk-worm gut sutures and a tight bandage applied. The opening into the skull was felt to be circular and large enough to admit the end of the fore finger. For the first few days following operation the fontanelles were markedly tense, but this was relieved upon the removal of the tight bandage. The child reacted very quickly from the anesthesia. The temperature did not rise above 101° , and was normal after the third day. The wound healed by first intention, and the stitches were removed on the seventh day. The child gained 11 ounces during its stay of twelve days in the hospital, being nursed by its mother. Three weeks after operation there was no bulging or impulse on crying at the seat of the tumor. The fontanelles were normal and the child appeared to be thriving normally.

1706 Rhode Island Avenue.

Cytodiagnosis of Mumps.—Sicard and Dopter (*La Presse Médicale*) obtain saliva directly from the parotid gland by introducing a short piece of a fine sound through the excretory duct of the gland. The saliva drips from the sound and is easily collected for examination. That taken from 32 persons free from mumps contained very few cells, not more than one or two to the field, but the saliva from 52 persons with mumps showed pathologic almost from the onset in 49 out of 52. It is easy by examining the saliva from the gland in this way to differentiate parotitis at any stage and to reveal the parotitic origin of certain affections of the testicles.—*New York Medical Journal.*

Obituary.

JAMES FINLAYSON, M.D., LL.D.

By the death of Dr. James Finlayson, which occurred on October 9th last, at his residence in Glasgow, Scotland, the ARCHIVES OF PEDIATRICS has lost one of its most distinguished collaborators, and all of our readers will be grieved to learn of his removal from a very wide sphere of usefulness.

Born in Glasgow on November 22, 1840, he graduated from the Glasgow University in 1867 with the highest honors. The subject of his graduation thesis, which characterizes his accurate habit of mind, was: "The Value of Quantitative Methods of Investigation in Medicine and the Allied Sciences." Dr. Finlayson at once entered upon hospital practice, and was all his life engaged in clinical teaching as well as being a prolific writer upon clinical medicine, physiology and anatomy, medical history and biography. He was always interested particularly in diseases of children, and wrote the chapter on "Diagnosis" in Keating's Cyclopaedia, together with numerous papers which appeared in ARCHIVES OF PEDIATRICS and *Jahrbuch für Kinderheilkunde*. In addition to these articles on pediatrics, his numerous papers on a wide range of medical topics appeared in practically every prominent medical journal in Europe. His first published paper was on the "Normal Temperature of Children," and pointed out the diagnostic value of an evening rise of temperature. The keynote of Dr. Finlayson's medicine was accuracy, and this is well exemplified in his "Clinical Manual for the Study of Medical Cases."

As a practitioner and consultant he was held in highest regard by both patients and medical colleagues. In the words of Dr. Hunter, the minister of the church which Dr. Finlayson attended for many years, "He was a man of noble culture and character—thoughtful, refined, large-hearted and sympathetic. He brought to the help of his patients not only all that medical science could suggest, but all that could be added from his own long experience, and from that fine culture of mind and spirit which when possessed give such new power and dignity to professional service."

ARCHIVES OF PEDIATRICS.

FEBRUARY, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellarie
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

Contributors and Correspondents, see page III.

THE PRACTICAL APPLICATION OF THE NEWER KNOWLEDGE OF THE CHEMISTRY OF MILK.

Certain recent work upon the chemistry of milk bids fair to revolutionize to a marked degree our conception of the problem of artificial feeding. Many of the valuable rules and principles which now guide us have been developed through clinical observation and experimentation without any very systematic effort to find reasons for their successful employment. Little assistance in the solution of these problems could be derived from the older treatises upon the chemistry of cow's milk. With the publication, however, by an American investigator, Van Slyke, of his researches into the commercial processes of cheese-making, certain data became available which were capable of furnishing important deductions applicable to infant feeding and infant digestion.

These data may for present purposes be summed up by saying that the casein in suspension in cow's milk which, as calcium casein, normally holds in combination a definite amount of calcium, is readily transformed by the rennet ferment in a weakly acid medium into the calcium paracasein or junket clot. By the further addition of acid the clot is changed into acid paracasein curd. No such clotting or curding by rennet will take place if the milk is made alkaline, but subsequent neutralization of an alkalized milk by a slight excess of acid will restore its susceptibility to rennet action. A moderate acidity enhances the activity of rennet, but with the absence of rennet sufficient acid to fully satisfy the casein's affinity for acid so changes the casein into acid casein curd that the subsequent addition of rennet produces no alteration in the type of curd.

In short, the power of casein to combine either with alkalies or acids is so definite that it can be utilized to modify or prevent the formation of the large, tough contractile curds which result to a greater or lesser degree from the combined action of rennet and acid upon cow's milk when introduced into the human stomach.

We have thus discovered that the addition of alkalies to milk not only forms new chemical compounds with casein, but produces distinct effects upon the processes of digestion. A small amount of the alkali simply delays curding pending the neutralization of the alkali by the acids present in or secreted by the stomach. This delay alone tends to prevent the curding of the milk in large, solid masses, and favors the formation of smaller and more flocculent curds. On the other hand, if the alkalization is sufficient not to be overcome readily, part of the still uncurded milk will probably escape through the pylorus to be digested in the intestine, and so relieve the stomach of part of its work. If the gastric digestion is weak and faulty, this is often an advantage, and it may even be possible to shift the entire burden of digestion to the intestine.

It is evident that agents capable of such radical influence upon

the processes of digestion should not be used without careful discrimination. They may be of extreme value in the feeding of infants unaccustomed to the digestion of cow's milk or for infants with weakened gastric digestion. We may employ them to change the character of the curds or to divide the labor between the stomach and intestine, so as to avoid overtaxing the former organ; but we must keep in mind that the infant's stomach must be developed during infancy, and that it gains strength only when a carefully graded increase of work is demanded of it. Grading the increase of work is indeed the true explanation of the results obtained by the time-honored use of lime-water as a routine measure in modifying milk. By the addition of 1 ounce of lime-water to every 20 ounces of milk mixture irrespective of the quantity of milk entering into its composition, the casein in the earlier and weaker mixtures is more profoundly affected by the lime-water than in the later ones in which the milk is progressively increased while the quantity of lime-water does not vary. The inhibiting action of the alkali upon coagulation is thus gradually withdrawn as the normal stomach in its development becomes equal to greater tasks.

The various alkalies in common use do not necessarily act in precisely the same way. Lime-water is distinctly alkaline and but weakly antacid. Sodium bicarbonate is very weakly alkaline, but distinctly antacid. The calcium of lime-water enters up to a certain limit into further direct combination with the casein, and this is probably true of the sodium, magnesium and potassium of the other alkaline antacids. It is extremely probable that these new combinations vary in their digestibility, and more especially in their solubility. In disturbed conditions of the stomach, accompanied by the formation of abnormal acids, alkaline additions to the milk neutralize these and prevent sudden and disastrous curdling of the milk in large masses, such as may be formed in the presence of rennet by abundant acid. One of the sources of an undue amount of acid may be the lactic acid or acid salts present in milk which has just begun to sour. In this stage it is more dangerous for infants than a fully soured or clabbered milk, for in the

latter stage the lactic acid has removed the calcium from its union with the casein and made lactate of casein, and in this form rennet cannot change the soft acid curds into those which are tough and leathery. Decalcified casein will then not only not form tough curds, which may be difficult or even impossible of digestion, but a further combination of the acid with this decalcified casein makes a soft, friable and easily digested lactate of casein curd. This is the principle which underlies the use of buttermilk and acidified milk in infant feeding.

A similar decalcification of the casein by the citric acid radical of citrate of soda, the consequent prevention of tough rennet curds and the easier digestibility of the subsequent combination of the casein with the hydrochloric acid of the gastric secretion explains the present popularity of citrate of soda, which it is claimed enables larger proportions of milk to be given without digestive disturbance. Thus, with some definite understanding of the action of both alkalis and acids upon milk and their effects upon the digestive processes, the way is cleared for their more intelligent use both as routine measures and in the treatment of infants with enfeebled or disturbed digestions.

THOMAS S. SOUTHWORTH.

Lab Ferment and Digestion of Milk.—Meunier (*La Presse Médicale*) has been studying the substance in the stomach which coagulates casein, and has found that the amount varies within wide limits in different persons. Those with small proportions of this lab ferment are the ones who find difficulty in digesting milk. His research has shown that there is a close connection between the secretion of this substance and the digestion of fats. This is due, he thinks, to the way in which the lab ferment retards the passage of the milk along the intestinal canal, thus enabling it to be submitted longer to saponifying influences and thus favoring the absorption of the fat during the intestinal digestion. Defective digestion of the fat in milk, from absence of the lab ferment, may engender the intestinal troubles noted in some persons on a milk diet. He describes a method for determining the proportion of lab ferment in the stomach contents.—*New York Medical Journal*.

Bibliography.

The Practice of Pediatrics. In original contributions by American and English authors. Edited by **Walter Lester Carr, A.M., M.D.**, Consulting Physician to the French Hospital, New York; to the New York Eye and Ear Infirmary; Visiting Physician to the New York City Children's Hospitals and Schools; Member of the American Pediatric Society; formerly Editor of *ARCHIVES OF PEDIATRICS*. Large octavo, about 1,015 pages, with 199 engravings and 32 full-page plates in colors and monochrome. Price, cloth, \$6.00.

The question always arises, with regard to a new book in a well-occupied field, "Does the book justify its existence?" This new work on the Practice of Pediatrics has features that make it a valuable addition to the text-book literature of the subject. Dr. Carr, for several years the editor of *ARCHIVES OF PEDIATRICS*, has kept constantly in mind the needs of the great body of practising physicians and students in the task of getting this work together, and the result is very satisfactory.

The book is made up by the contributions of fourteen well-known writers on pediatric subjects. Necessarily the style of the various chapters cannot be uniform; but so well has the editor's work been done that there are no gaps, and no more overlapping or repetition of subjects than is really needed for clearness and convenience.

The section on the Newly-born Infant has been presented from the obstetrical standpoint by Dr. Edward P. Davis. The late lamented Dr. Yale has written a section on Development and Hygiene. These chapters are very suggestive and contain much anthropometric material not readily accessible elsewhere.

Dr. Southworth discusses Infant Feeding. This is a very valuable and, as it should be, probably the most practical section of the book; embodying, as it does, the latest discoveries in regard to the casein of cow's milk, it enables the reader to explain many formerly perplexing experiences in infant feeding. There is a very good exposition of the principles of the digestion of cow's milk and of its use in infant nutrition. A point that will be of interest is, that the average amount of milk sugar in cow's milk is stated to be about 5 per cent. rather than 4 per cent. as heretofore regarded.

Dr. Bovaird, who writes upon the Diseases of the Alimentary

Tract, finds chronic gastritis much more frequent than many writers. The Diseases of Nutrition are treated by Dr. George M. Tuttle; Tuberculosis, by Drs. Abt, Bovaird and McCarthy.

The chapter on Diphtheria is a very valuable one, written by Dr. M. Nicoll, Jr., containing as it does precise directions for the performance of intubation. As regards the dosage of antitoxin, the author advises from 2,000 to 4,000 units in a mild case of pharyngeal diphtheria; in a laryngeal case from 5,000 to 10,000 units. The dose is to be repeated in all instances within twelve hours if the patient does not improve. For immunization the dose recommended is from 500 to 1,000 units.

Dr. Crandall treats of Scarlet Fever, of Measles, Chicken-pox and Smallpox. These chapters are practical, and as full as space in such a book would allow. The Diseases of the Respiratory Tract are treated by Dr. Rivière. The chapter on the Heart and Blood-vessels is of especial interest because written by Dr. Poynton, who has so carefully studied the microorganisms found in rheumatism. Diseases of the Genitourinary Tract are discussed by Dr. C. G. Jennings; those of the Blood by Dr. Ruhräh; those of the Nervous System by Dr. McCarthy.

The chapter on the Skin, by Dr. Charles Townsend Dade, is an unusually valuable one for such a book, inasmuch as only a few of the commonest diseases are discussed. Special directions for each stage of the disease as it appears are given.

In view of Dr. Carr's long and large experience, one wishes that he himself had written two or three of the chapters instead of modestly delegating all of them to other authors.

The book is well printed and abundantly illustrated.

Treatment of Scalp Ringworm.—T. C. Fox (*Journal of Hygiene*) employs a treatment adapted from Aldersmith, applying an ointment containing 4 gm. (1 dr.) of croton oil to 30 gm. (1 oz.) of base. This is rubbed in daily, or as often as necessary to excite the desired inflammation. Pus is cleaned away rigorously, and crust formation is not allowed. For isolated and residual stumps, croton oil needling is by far the best treatment. This is performed by lightly coating a triangular glover's needle with croton oil, and then gently insinuating it deeply into the diseased follicle, care being taken not to pierce the skin.—*American Medicine*.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.— SECTION ON PEDIATRICS.

Stated Meeting, November 8, 1906.

MATTHIAS NICOLL, JR., M.D., CHAIRMAN.

STRUCTURAL CHANGE IN ESOPHAGUS WITH SPASM.

DR. MATTHIAS NICOLL, JR., presented the patient, a boy eleven years old. Six years ago he swallowed some lye, which was followed by vomiting of the contents of the stomach and of mucus, but no blood. Lemon juice and sweet oil were given, and the boy was quite ill for a day or two, having distress on swallowing anything but liquids. From this time on—five years—he had more or less trouble with his stomach, swallowing only liquid and semi-solid food. At times he was better than at others. When first seen, October 17, 1906, at Bellevue Clinic, he had been trying to eat meat and had choked; for forty-eight hours he had not been able to take anything, not even water. Evidently there was a plug in the esophagus, and the boy was sent to Bellevue Hospital, placed on the table, and turned upside down; this caused the removal of two small pieces of meat. He was then able to take small quantities of milk. This child presented a sign that Dr. Nicoll had not before seen described. When swallowing water, if one listened with a phonendoscope over the sternum, one could hear the water as though it was squirted into the distended stomach, the sound keeping up for some seconds. Now this sign did not appear. The child no doubt had some structural changes in the esophagus, with more or less constant spasm. No bougie had as yet been passed.

DR. J. FINLEY BELL, of Englewood, was reminded of a case seen in the early part of his professional experience. A boy of seven years had swallowed lye when two years old and had a resulting strictured esophagus. For months before Dr. Bell saw him he was not able to take any other food than milk; if even a crumb of bread had preceded the taking of milk he would be obliged to bend over and permit the milk to run out. There was

dilatation of the esophagus above the point of stricture. The little boy was sent to the late Dr. Sands, who sent to Paris for special instruments to dilate the stricture. After a stay in New York of about eight months under Dr. Sands' treatment, the patient was sent home to Pennsylvania able to eat beefsteak.

Dr. Bell did not have the opportunity of seeing the instruments used, because soon after Dr. Sands died. Dr. Bell has heard indirectly from this patient recently, and according to this information he remains perfectly well, and is a practising attorney in Pennsylvania.

DR. L. E. LA FÉTRA said that several years ago at the New York Hospital he saw two or three such cases occurring in children. In those cases in which it was possible to pass a bougie, dilatation could be done gradually and the results were quite satisfactory, although it was necessary for a long time to pass two or three graded bougies once a week. The webbed bougie passed readily enough and did no harm. After one had determined the site of the stricture it was a simple matter. At the Vanderbilt Clinic two or three years ago, a boy came back and showed the most satisfactory results had been obtained. There were all sorts of cutting operations, strings, etc., for those cases in which a bougie or sound cannot be passed; but when cases improved as well as this, he thought operation to be contraindicated.

A CASE OF ATRESIA ANI VESTIBULARIS IN A CHILD THREE YEARS
AND TWO MONTHS OF AGE.

DR. SARA WALK-KAKELS reported this case, as follows:—

Annie B. was born at full term without instruments; not asphyxiated at birth, and seemed to be well developed; defecations were normal. The absence of the anus was noticed on the eighth day after birth, when an enema was ordered on account of constipation. Notwithstanding this anomalous condition, the child enjoyed good health and never went through any illness excepting some slight colds. The defecations were voluntary, painless and periodical; occasionally some constipation.

On examination the little girl is found well developed. Organs of thorax and abdomen are normal. There are no other congenital deformities, which frequently accompany atresia of the anus.

Inspection of the external genitalia shows well-formed large

and small labia; no trace of an anal opening; in its place there is a slight depression. The distance between coccyx and posterior commissure is $1\frac{1}{4}$ inch. In the space between the posterior commissure of the labia majora and the orifice of the vagina is a small opening of the size of a large pinhead, through which the feces escape.

A No. 9 A. catheter or the tip of the little finger can easily pass through the opening into the intestine. The short, fistulous canal is lined with mucous membrane, continuous with the mucosa of the vestibulum; there is no discharge of feces from the vagina.

To explain this anomalous condition we must recall the early development of the fetus.

In the fourth week of fetal life the terminal portion of the gut communicates with the allantois; between them is a layer of connective tissue, called septum Douglassii; this advances downward and unites with the perineum, both separating the genital from the alimentary tract; the formation of the cloaca takes place in the fifth week of embryonic life.

While heretofore the atresia of the anus was explained by an arrest of development, later researches have shown that communication of the cloaca with the terminal gut always takes place; subsequently, however, obliterations in the already formed rectal tube may take place. These obliterations occur principally at the anus, and at the junction of the ecto- and entoderm. They may be caused by fetal peritonitis, syphilis or intussusception; heredity seems to be a potent factor.

The outer fistulous opening of the intestine into the vestibulum in the above case is explained by an irregularity in the formation of the perineum; the latter is formed by two eminences, situated at the sides of the genital slit; between them is a groove which leads posteriorly to the anus, and anteriorly, in the female, to the vestibulum. Under normal conditions this groove closes in the raphe of the perineum. Under abnormal circumstances, when there is an obliteration of the anus, the groove may remain open and be converted into a canal, opening posteriorly into the rectum, and anteriorly, in the female, in the vulva or perineum.

A CASE OF HODGKIN'S DISEASE.

DR. HENRY HEIMAN presented a boy, eleven years old, who was born in Russia and who had been living in this country for

about one year. The family history was negative. His father and mother were cousins; their other four children were well. There was no tuberculosis in the family. The patient was a full-term, normal baby, breast-fed for one year. At the age of three he had measles and pneumonia. When five he had a mild attack of scarlet fever. He never had malaria.

The present illness began apparently two years ago, with gradually increasing weakness and pallor. The swelling of the cervical glands was first noticed about one and a half years ago, when intermittent fever and night sweats appeared. There has been no cough nor expectoration. The appetite has been poor, and he suffered from occasional attacks of diarrhea. There have been no hemorrhages from any of the mucous membranes.

The physical examination of the patient revealed: General condition poor; weight, 52.8 pounds, the normal weight at his age being 72 pounds. There was considerable pallor of the skin and mucous membranes. There was enlargement of the lymph nodes, especially of those along the right sterno-cleido-mastoid. These were matted together, the individual nodes varying in size from that of a bean to a walnut. In the left cervical region, both axilla and groins, the glands were the size of peas. The left border of the heart was one finger outside the mammary line and one finger to the right of the sternum. The heart's action was rapid and somewhat irregular. There was a systolic murmur at the apex and at both basic orifices, the former being transmitted to the axilla. The abdomen was not distended, and there was no ascites. The spleen was enlarged and was felt three fingers below the ribs; it was firm in consistency. The liver was felt three fingers below the free border; the fundi were negative. The examination of the blood by Dr. Feldstein gave the following results: Hemoglobin, 42 per cent.; red blood cells, 3,200,000; white blood cells, 6,600. No plasmodia were found. Differential count of the white cells (160 cells) showed: polymorphonuclears, 78.7 per cent.; large lymphocytes, 13.8 per cent.; small lymphocytes, 6.9 per cent.; mononuclears, 0.6 per cent. As a result of the blood findings, Dr. Heiman felt justified in making the diagnosis of Hodgkin's disease. This disease is often associated with tuberculosis and syphilis. The prognosis is usually unfavorable. The treatment was practically limited to the administration of arsenic, preferably by subcutaneous injections. If tuberculosis or syphilis is suspected, the patient should receive appropriate treatment.

The treatment with the X-rays must also be mentioned, as several authors have reported favorable results from their use. Some clinicians have also found Coley's fluid of value in diminishing the size of the lymph nodes.

DR. LOUIS FISCHER said that sometimes these symptoms might be caused by some latent condition in the lungs. In one case of his the blood showed a marked leukocytosis with a reduction in the hemoglobin percentage. There was a profound anemia. The diagnosis of Hodgkin's disease was made by two good men. Three months later the child had a cough and there was a sudden breaking down in the lungs. The patient developed a retro-pharyngeal abscess, caries of the cervical vertebra, and all the symptoms pointed to tuberculosis.

DR. LA FÉTRA asked if tuberculin had been used as a means of ruling out complicating tuberculosis of the nodes. He believed this to be a case of Hodgkin's disease. Four years ago he saw a case in Dr. Jacobi's wards, which came under his care during the summer. Dr. Jacobi had been using arsenic in large doses and with wonderful results. The child had a swelling which was almost the size of a large grape-fruit; that swelling came down greatly in size under the use of Fowler's solution of arsenic, the quantity administered being gradually increased to 100 minims a day.

DR. HEIMAN said that it had been impossible to administer tuberculin because of the constant temperature, varying from 101° to 103° F. If the patient were in the hospital and his temperature were normal, he might employ tuberculin as a crucial test.

WHOOPING-COUGH—ITS TREATMENT BY AN IMPROVED ABDOMINAL BELT.

DR. THERON W. KILMER read this paper, which will be found in full on page 112.

DR. MATTHIAS NICOLL, JR., said that he had tried an improvised belt, and had been favorably impressed with the results obtained. The severity of the paroxysms seem to have been decreased, and there was less vomiting.

DR. LOUIS CURTIS AGER said that in the clinic at the Long Island College Hospital a modification of the belt presented had been used as routine practice. In some cases there had been a

marked cessation of the vomiting. From their experience it seemed that the effect to a certain extent was mental. One or two children with defective mentality were made worse rather than better. The vomiting increased rather than decreased. In one instance the belt had to be taken off because the severity of the paroxysms became so great.

DR. HOAG said he had used the belt in cases of whooping-cough in a number of cases. The number of paroxysms was diminished and the amount of vomiting would be decreased from 50 to 75 per cent.; occasionally the vomiting actually ceased entirely. Last September he had a child of eight or nine years who had been coughing and vomiting for six or seven weeks, the child being reduced to a state of almost starvation. The belt was applied, and within two days the vomiting had stopped, and there was no further trouble from that source.

DR. ELISHA MATHER SILL made a report on 161 cases of whooping-cough seen during the past year. There were 22 cases under the age of one year; 35 between the ages of one and two years; 92 between the ages of two and six years; the remaining 12 cases were over six years of age. Dr. Kilmer claimed that the use of the belt removed all possibility of complications. Seventeen of the 22 cases under one year had complications; of these 2 had bronchopneumonia, 4 had enteritis, 10 bronchitis, and 1 stomatitis, making a total of 17 cases. Of the 35 cases between the ages of one and two years, 8 had bronchitis, 5 gastroenteritis, 1 nephritis, and 1 bronchopneumonia; a total of 15 complications out of 35 cases. Of the remaining cases 14 had bronchitis, 3 had conjunctival hemorrhages, with hemorrhages into the eyelids, 4 had enteritis, 1 had otalgia, 1 had endocarditis, 3 had stomatitis; a total of 27 complications out of the remaining cases. When the belt was applied during the catarrhal stage, the patients were much benefited. The paroxysms were reduced in number and the severity of the paroxysms was markedly modified. In those cases that had developed some complications the use of the belt reduced the paroxysms and benefited the patients a great deal. With regard to the occurrence of the disease, it occurred most frequently during the months of March, May, September and October. When the belt was used the vomiting ceased in a very short time. Along with the treatment advised, fresh air was insisted upon, with the windows kept open at night. Out of the 161 cases there

were 59 complications. He used the old-fashioned binder pinned on by means of safety pins.

NOTES FROM A DIARY OF A CASE OF SPLENOMEGALY.

DR. ELI LONG presented this report: The child was born at term after a perfectly normal labor. At the age of three months the baby had diarrhea, lasting nine days, slight in severity. At this time the child was circumcised. When seven months old the first tooth appeared. When ten months old the child was weaned. He was then vaccinated. When one year old he had slight diarrhea for two days. When fifteen months of age he had a severe attack of diarrhea, lasting ten days. Emaciation was extreme. The abdomen was enlarged and the spleen was noted. He then had malaria fever, low in the morning, high in the afternoon. It lasted four weeks and ended by lysis. The liver was enlarged with the spleen. Hemoquinin and stupes were ordered. When twenty-six months of age a consultation was held and arsenic advised. There were symptoms of colitis. When three and a half years old another consultation was held, and the Röntgen rays advised. The rays were given three times a week for nine months. The bowels were irrigated with saline solution twice daily, with improvement in the colitis. When the child was five years old he had jaundice and epistaxis, and, six months later, cyanosis appeared with dyspnoea, especially marked on exertion.

The following showed the result of the blood examination: When fifteen months old the malarial plasmodia were noted. When two years old the hemoglobin was 62 per cent., the red cells 3,912,000, and the white cells 4,000. When three and a half years old no plasmodia were found and no indican. When five and a half years old there was a slight reduction in the hemoglobin, as well as a slight reduction in the number and size of the reds. They were not nucleated. There were no plasmodia found. The urine and the stools were normal. The circumference at the nipple line was 20½ inches; at the free border of the ribs, 23½ inches; at the umbilicus, 20 inches. The height was 3 feet 2½ inches; weight, 31½ pounds.

When the child was seen by Dr. Long the day before, he was poorly nourished, with slight cyanosis. There was a slight eczema behind the ears. A dry scalp was noted; condition of the teeth was good. There were no evidences of adenoids. The cervical glands were slightly enlarged. The axillary glands were not pal-

pable, but the epitrochlear glands were, especially on the right side. The inguinal glands were slightly enlarged. The lungs were normal. The heart-sounds were normal. The apex was displaced upwards and to the left about $\frac{1}{4}$ inch outside the nipple line and $\frac{1}{8}$ inch below. The ensiform appeared to be displaced to the right. The abdomen was prominent, as shown by a chart. The liver was enlarged and felt soft. The spleen felt very hard. A letter from Dr. Ewing was read, which bore on the diagnosis. Malaria was ruled out because in only one examination were the plasmodia found. No leukemia was present because there was no leukocytosis. Sarcoma was ruled out because of the length of the trouble, sarcoma being of short duration. Congenital syphilis would give more positive signs referable to the teeth and bones. The bone lesions described could be due to either syphilis or rickets. He did not believe the child had rickets. The mother had no abortions, and there were no signs of syphilis in either father or mother, and its former presence positively denied. He thought the case to be one of splenomegaly, possibly referring the bone lesions to rachitis. As to the etiology, the plasmodia were found but once, and then in enormous numbers. The question arose, Could malaria originate such hypertrophy of the liver and spleen, together with rachitic changes in the bones? The patient had indigestion lasting a year and a half, but the enlargement of the abdomen preceded this by seven months. The child belonged to people of means and had been given the best of food, and clean food. The urine was perfectly normal and indican was absent. One could not accept indigestion as an etiologic factor. Syphilis was absolutely denied. There were no evidences pointing to rachitis. Therefore, one must come back to the one attack of malaria as a cause of the hypertrophy of the liver and spleen, with the questionable possibility of intestinal intoxication as a factor; or to a congenital abnormality of the blood-forming organs.

DR. HENRY W. FRAUENTHAL asked if there were other members in the family.

DR. LONG replied, an older child.

DR. FRAUENTHAL, speaking of syphilis, said that the disease did not give evidences of its existence in the first teeth. The enlarged liver and spleen and glands and the bone deformity might be attributed to syphilis. He said that Fournier had reported 282 cases; 251 of these remained well until the fourth year, and in

many it was the twenty-eighth year before the secondaries appeared. Parents may have been infected after the birth of the first child. He asked Dr. Long if bichlorid or other mercurial had been used.

DR. LONG replied that it had been used accidentally, the patient having been given some calomel.

THE PRINCIPLE OF TOP MILK.

DR. HENRY DWIGHT CHAPIN read this paper. He said that since the general acceptance of the idea that fresh cow's milk should be the basis of the artificial food for infants there had been proposed a great many schemes for modifying milk in the home on the percentage plan. The top milk method, when its advantages became thoroughly and generally understood and appreciated, would undoubtedly displace all other methods. By its use the food was ready for the infants several hours sooner after milking than when bought cream and whole milk were used, or when it was necessary to wait for the cream to rise in the home, a fresher food being the result; again there was less danger of secondary contamination of the milk; again, a great many percentage combinations might be made up with remarkably accurate results, gross errors being practically impossible. For top milk modification bottled milk was almost a necessity. The strong point of the method was the ease with which percentages could be varied and the mixtures made up by nurse or mother. The principles on which the percentage modification by the top milk method were based were very simple, and were as follows: The fat of the milk being lighter than the serum rises to the top as cream. The proteids and sugar remain distributed throughout the milk, but were slightly less in the very rich cream of the upper layers. There were about 5 to 7 ounces of cream to a quart of milk. If this cream was all removed, along with enough of the remaining milk to make 16 ounces, there would be two pints of milk, one containing all the fat of a quart of milk, and the other pint being practically fat free. It was self-evident that the percentage of fat in the pint containing all the fat of a quart, or two pints of milk, would be twice that of the original quart. If this was 4 per cent. there would be 8 per cent. in the top milk. If all the fat was in the one-third of a quart of top milk the percentage would be three times 4 per cent., or 12 per cent. In practice all of the fat would

not rise in the cream, so this mathematical ratio did not hold good exactly. Thus the top 15 ounces were about twice as rich in fat as the original milk, and the top nine ounces three times as rich instead of the top half, or 16 ounces, or the top one-third, or 10 $\frac{2}{3}$ ounces. The error should not be made of thinking that the top 15 ounces or top nine ounces would contain any definite percentage of fat regardless of the richness of the original milk, for that would be an impossibility. Milk did not run absolutely constant in fat percentage, so a margin of error must be allowed for. But by working on a 4 per cent. basis the error would always be only a little above or a little below the calculated percentage. For several years Dr. Chapin had been having the milk at the Babies' Wards of the Post-Graduate Hospital assayed to determine how uniformly this rule held good, and the following are the average assays:—

	Whole Milk.	Top 20 Ounces.	Top 16 Ounces.	Top 9 Ounces.
1903	4.4%	6.5%	8.4%	13.9%
1904	4.5%	....	8.0%	12.4%
1905	4.8%	6.5%	8.5%	13.1%

These figures represented the results obtained from 676 separate assays, made during three years. The principles involved in the use of the top milk were: (1) The use of milk, bottled at the dairy as soon as possible after milking. (2) The rapid cooling of the bottled milk, which favored separation of the cream and retarded bacterial growth. (3) The taking of definite quantities from the upper portion of the quart of milk, which should include *all* of the cream, together with a portion of the under milk. If this was not done no consistency in composition could be expected. After these steps had been followed, preparation of the food consisted in simply diluting and adding sugar. The various layers required can easily be procured by the use of Dr. Chapin's cream dipper, which holds an ounce. The top 9 ounces presents a ratio of fats to proteids of 3 to 1; the top 16 ounces, 2 to 1; the top 20 ounces, 1 $\frac{1}{2}$ to 1.

DR. THOMAS S. SOUTHWORTH believed it to be a safe postulate to say that a man used with the greatest success and flexibility the method of infant feeding with which he had had the greatest experience. This would apply especially to the two methods—milk and cream mixtures and top milk mixtures. In recommending a method to be taken up by any one who was starting to undertake

infant feeding, it seemed to him that the use of "top milks" was simpler and was accompanied by more advantages. In certain cities, like Philadelphia for instance, it was said to be possible to obtain percentage creams which were exact, but such percentage creams were not generally obtainable here. The top milk mixtures had distinct advantages in that they gave gravity and not centrifugal cream. The less manipulation of the milk, the better for the infant, and gravity cream is less manipulated than cream removed by the centrifugal process. Both milk and cream, when top milk was used, were of the same age and from the same source. The method of using top milk was applicable to city as well as country. As Dr. Chapin had stated, the figures the general practitioner had to carry in his mind were fewer with the top milk system than with milk and cream mixtures. Serious errors unquestionably often crept in in making milk and cream mixtures, because "cream" may contain anywhere from 16 to 40 per cent. fat. Of course, there were variations in the fat of similar top milks, but the possible variations were never so great.

DR. GODFREY ROGER PISEK said that different writers had divergent views regarding infant feeding, but that they are now focussing upon certain principles which would remain and could be adopted in infant feeding. This would make the subject clearer and would clarify the field very much. The use of top milks was an important item. Dr. Pisek favored the modifier, and said it would be a boon to the infant feeder, and especially to unintelligent mothers. The mother could be easily shown how much milk to remove, to what point to put in the top milk, and how to add the diluent to the top line, and with very satisfactory results. This modifier had been used by him in the dispensary with very satisfactory results, especially in those cases that had been improperly fed and where he wished to accustom the child to proteids; here one might start with a low proteid and rapidly raise it to the desired percentage. He often started with a 0.4 per cent. and gradually increased it to 1.5 per cent. proteid mixture.

DR. LA FÉTRA said that when he began to employ the percentage method, the plan in vogue was to use milk and cream. Top milk had many advantages in infant feeding. It was safe, for the milk was fresh and the method is simple. If one looked at some of the text-books of today and studied infant feeding, the

formulæ were appalling, and reminded one of a problem in integral calculus. We should discard any method of infant feeding that frightened the average medical man. The top milk method gave an easy method of getting at an accurate percentage. It was only necessary to drive in a few pegs in our minds—it was not necessary to carry many figures—and a proper modification of the milk was easily obtained.

The top milk method has an advantage with regard to the expense, for if cream could be obtained of specific percentages, immediately the percentage method would be too costly for the majority of people, as they could not afford to pay for laboratory cream. The majority of the babies requiring artificial feeding belong to poor families. Eight or ten cents a bottle is as much as these families can pay. Dispensary patients could be treated very satisfactorily with top milk modifications. This method prevailed at the Vanderbilt Clinic, and with very gratifying results. Mothers understood the method and could carry it out with satisfaction. The accuracy was sufficient for all practical purposes. The modifier or graduate presented was a very valuable adjunct, and mothers could be readily taught its use.

DR. ELIAS H. BARTLEY said that at present there were two grades only of centrifuged cream, one 20 per cent., the other 40 per cent. Gravity cream now seldom reaches the New York market. He doubted whether one could get other than these two grades of cream in Brooklyn. So far as the percentage of fat was concerned, they could get cream of a known fat percentage. An important thing to his mind was in the old cream mixtures to know the history of the cream. Three years ago he went to Orange County to look over some dairies; there he saw four cans of cream which had been returned from Philadelphia, and it was thick and sour. A gentleman told him that 90,000 forty-quart cans of cream had been in cold storage since last April, and were now, in the latter part of July, being put into the market when the cream brings a better price than in the spring. If one took cream and kept it two or three months in cold storage the bacteria would multiply, slowly to be sure, and such cream would give bad results. This was the difficulty which drove him from the use of cream and milk mixtures, and now he used only the top milk method. He attempted to use laboratory milk several years ago, but he had poor success with it. He had made many examina-

tions of the layers of top milk, and he got substantially the same percentages as those obtained by Dr. Chapin.

With regard to accuracy, on looking over the report of the Milk Commission, he found that there were variations from 3.8 to 6.7 per cent. in the milk served by one dealer during the same month, and he had also noted that from the same dairy there occurred a jump from 3.8 to 5 per cent. in two weeks' time. Here is a very great difficulty to overcome. The great difficulty was that we could not rely upon the same composition of milk from even the same dairy. It might be all right so far as the proteids were concerned, but not as regards the fat. Unless they had a standardized milk they could not claim the accuracy the reader of the paper assumes.

DR. CHAPIN, closing the discussion, said that he claimed for the top milk method a constant relationship between the fats and the proteids. What he offered was entirely practical, and the figures given on the chart he presented were accurate and constant. In his examinations of milk he did not obtain the same variations as others claimed. In New York City the fat was a little over 4 per cent., and this was a commercial matter; the dealers could not afford to sell milk that was excessively rich for the price paid for it.

Tuberculous Peritonitis in Children.—Faludi (*Jahrbuch für Kinderheilk.*, Vol. LXII., No. 3) sifts the literature on this subject and reviews the material at the Stephanie Hospital, his conclusions being all in favor of laparotomy at the earliest moment in cases of ulcero-caseous or fibro-adhesive tuberculous peritonitis in children. The results are liable to be excellent in such cases. In the form with effusion, hygienic-dietetic treatment should first be given a thorough trial. If it fails or is not convenient, then laparotomy should be done without delay. Punctures should not be attempted. A serious tuberculous affection in another organ is a contraindication to laparotomy, but not so fever or debility. Circumscribed tuberculous inflammations in children always demand surgical intervention. The after-treatment in all these cases is of vital importance, the dietetic and hygienic measures being supplemented by the proper antituberculosis medication.—*Journal of the American Medical Association.*

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, October 9, 1906.

ALFRED HAND, JR., M.D., PRESIDENT.

ABSCESS OF THE LUNG.

DR. JOHN E. HUME presented this patient, a girl of ten years, who had an abscess of the lung following an attack of pneumonia. She had the typical sputum, irregular fever and profuse sweating. The physical signs of an abscess cavity were present over the base of the left lung posteriorly. Gradual progressive improvement was taking place under internal medication and pulmonary gymnastics.

DR. ALFRED HAND spoke of the marked clubbing of the fingers in this patient, a sign that he had rarely seen occur in tuberculosis of the lung. He has at present under his care a patient just out of childhood, who came to him with a history of abscess of the lung following pneumonia. He suddenly expectorated about a pint of pus. The signs were those of a cavity, with bubbling râles, near the left apex. Dr. Hand watched this boy for almost six months. Then, after not having seen the patient for about a month, he noticed that the fingers were clubbed quite markedly. The rarity of this symptom in tuberculosis is sufficient to constitute a point in the diagnosis.

ACUTE ALCOHOL POISONING.

DR. S. W. MOORHEAD showed two boys, four and seven years old, who had had acute alcohol poisoning. One of the patients recovered entirely in about twenty-four hours, after a period of unconsciousness lasting eight hours. The other exhibited convulsions lasting for ten hours; and, after a period of two days, another series of three convulsions. Later, there were transient hallucinations of sight and hearing, with mild mental symptoms. (The cases are reported in full on page 108.)

DR. J. P. CROZER GRIFFITH said that he was interested in these cases because alcohol poisoning is not very common in children, and because the presence of convulsions was extremely well marked in the younger child.

Not having seen convulsions following alcohol, he tried to find what had been the experience of others on the subject; and he was struck with the fact that he could find so little in the literature

about it. He consulted a well-known text-book on therapeutics, which referred to the fact that there is often coma lasting for several days; but the convulsions were ignored entirely. In a few books by foreign and English authors, Dr. Griffith read that convulsions are rare in adults, but frequent in children with alcohol poisoning. He inquired what had been the experience at the Children's Hospital, and was told that while they had had a number of cases, in none had convulsions occurred.

For these reasons Dr. Griffith considers this boy's case rather unusual. Before listening to Dr. Moorhead's report Dr. Griffith had supposed that the child might not have been well developed mentally, and that this fact might account for the hallucinations, which certainly have nothing to do with acute alcoholic poisoning. The child, however, is mentally bright enough, so far as can be learned. It would be interesting to find out how much alcohol the boy had taken.

DR. HAND said that in one case occurring in his service at the Children's Hospital he had used a medicine highly recommended by Norman Kerr, an English writer on inebriety—acetate of ammonia. This is claimed to be a specific antidote to alcohol. Dr. Hand asked for Dr. Hare's opinion concerning this method of treatment.

DR. HOBART A. HARE said that when he was a student this remedy was recommended by Dr. Stillé for this condition, so it would not be fair to give Kerr the credit. This drug was to be given in the form of liquor ammonia acetatis, but Dr. Stillé expressed a doubt as to its specific power. In many cases of acute alcoholism in which the symptoms come on very suddenly, as they occasionally do (Dr. Hare had seen men apparently sober to a certain point, then become suddenly violent or unconscious), a few drams of pure vinegar will reestablish consciousness and a degree of sobriety with extraordinary speed. There is some relation between acetic acid and acetate of ammonia, and this may be the explanation of the effect of the latter drug.

Another point is that there are two types of these cases of alcoholic convulsions—alcoholic epilepsy, so-called, which occurs in persons with a poorly developed brain and an epileptic tendency, who later become epileptics; and another type, which is less frequently seen, but does occur. Dr. Hare had cited a number of cases of this sort in an essay on epilepsy written by him. He had

also cited a number of cases in persons, not children, of acute alcoholic epilepsy. This form occurred in persons taking an inordinate quantity of concentrated spirit, who suddenly developed acute epileptiform convulsions.

DR. E. E. GRAHAM read a brief résumé of the work done in the Section of Diseases of Children at the Boston meeting of the American Medical Association, held in June last. (This paper was published in full in the ARCHIVES OF PEDIATRICS for November, 1906.)

DR. ALFRED HAND, JR., reported the papers read on Diseases of Children at the Toronto meeting of the British Medical Association, held last August.

DR. J. H. MCKEE reported the papers read on Diseases of Children at the Bedford Springs meeting of the Pennsylvania Medical Society last month.

THE RELATION OF THE LYMPH GLANDS IN THE MEDIASTINUM TO DISEASE, AND THEIR VALUE IN EARLY DIAGNOSIS.

DR. W. S. NEWCOMET read a paper on this subject, which he illustrated with radiographs of the chest, showing the glands in a number of early cases which, under the ordinary methods of physical diagnosis, were impossible to detect. The method is particularly useful in cases of tuberculous disease, especially of the glandular type, the form that usually occurs in children and young adults. There are, however, cases of syphilis and cancer which, under some conditions, might become confused with this; although they usually present a somewhat different arrangement of the glands, which gives a decided point of differentiation.

One case occurring in this group was one of acute leukemia. The enlarged glands were easily detected several weeks before there was any external evidence of the disease. It was at first thought to be a case of miliary tuberculosis, but a blood count led to a determination of the exact character of the disease.

Although this field has of late received very little attention, half a century ago a number of volumes were devoted entirely to it. However, if all cases of obscure fever with slight chest symptoms were more carefully studied, no doubt these bronchial glands would be found to play a rather active role; and many instances in which pulmonary tuberculosis is really the cause of the disability would be less likely to escape unnoticed.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, November 20, 1906.

J. W. VAN DERSLICE, M.D., PRESIDENT.

(Clinical Meeting.)

CONGENITAL HEART DISEASE.

DR. MAY MICHAEL showed this patient, a little girl of six years; there was no history of heart disease in the family. Born after normal labor, she was well until at eight months old, when she contracted a severe whooping-cough. The mother then first noticed cyanosis. Since then the child has never been quite well, although she plays like other children, has a good appetite and sleeps soundly. She soon tires, however, grows short of breath, and at times coughs.

Examination shows a poorly nourished child with marked cyanosis; the lips, cheeks, ears, finger tips and mucous membranes are purple; there is dilatation of the superficial capillaries of the cheeks and a decided clubbing of fingers and toes. The chest shows bulging precordium and a diffuse apex beat, felt most distinctly in the sixth intercostal space just within the nipple line. The heart is greatly enlarged, but mainly to the right. Auscultation reveals a rather rough, systolic murmur, sometimes blowing, loudest over the pulmonic area, but transmitted also into the vessels of the neck, as well as a decidedly accentuated second tone. Examination of the lungs shows nothing further than a few coarse râles posteriorly. The spleen and liver are palpable. The pulse is regular and full; the temperature normal.

Holt classifies congenital anomalies of the heart under three general heads: (1) Malformations resulting from imperfect development. (2) Fetal endocarditis. (3) Persistence of fetal conditions, such as the foramen ovale and ductus arteriosus.

As development of the fetal heart is nearly complete by the end of the second month, the factors producing errors in development must be at work early. Heredity without doubt is a conspicuous one. Malformations of the heart are often associated with

malformations of other parts of the body, like hare lip, cleft palate, imperforate anus, and the occurrence of congenital heart disease among idiots, especially the Mongolians, has been noted by many writers. Fetal endocarditis is comparatively frequent. It usually results from an infectious disease or rheumatism, when the microbes or toxins pass from the mother to the fetus through the placenta. The infection, however, may arise in the fetus itself, as in cases of syphilis. Hochsinger found 7 cases of congenital heart disease among 500 syphilitic children; Eyer found 3 cases among 5 of syphilis. Fetal endocarditis and malformations from imperfect development may be associated, when the malformation may, as a predisposing factor, determine the location of the endocarditis. Fetal endocarditis may be the cause of persistence of the ductus arteriosus and foramen ovale.

Congenital heart disease is not common. Monti each year met from 2 to 5 cases among 10,000. Dr. Michael had seen 4 or 5 among 7,000.

Symptoms of congenital heart disease are usually manifest at birth, but occasionally not until some time later, when, as with this child, the appearance is attributed to an intercurrent event, like whooping-cough. Cyanosis, dilation of superficial capillaries, dyspnea, clubbed fingers and toes are the commonest symptoms. These children suffer in growth and development and are sometimes subject to attacks of suffocation, when they lose consciousness, become more cyanotic, and the pulse grows rapid and thread-like; or consciousness may not be lost entirely, and then the face wears an expression of anxiety. These attacks may end fatally.

The physical signs vary with the lesion. Pulmonary stenosis, according to Hochsinger, is in frequency and significance most important. Dr. Michael believes pulmonary stenosis, associated with a patent ductus arteriosus, possibly a defect in the ventricular wall, is the form here present. Pulmonary stenosis by itself is characterized by an enormously enlarged right heart and a systolic murmur of maximum intensity in the pulmonic area, the results of the effort on the part of the right heart to force the blood through the narrowed orifice. There is also a weakened second pulmonic tone, in consequence of the small amount of blood falling back on the semilunar valves. If, however, with the stenosis there is associated a patent ductus arteriosus and a ven-

tricular defect, enough blood can pass back through the ductus arteriosus into the pulmonic artery to make the semilunar valves close with a sharp click, as one can so distinctly feel and hear in this case. The presence of a ventricular defect causes a pulse of greater volume than when pulmonary stenosis is unaccompanied by this lesion, as well as transmission of the murmur into the vessels of the neck.

In most instances congenital heart disease proves fatal before the fifth year, but scattered through the literature are found records of patients reaching adult and even old age.

The treatment is purely symptomatic.

DR. WM. J. BUTLER said that lesions of the pulmonary arterial tract are by far the most frequent of congenital heart lesions. Pulmonary stenosis, however, seldom expresses exactly the extent of the lesion anatomically, as it is invariably associated with other cardiac defects. This is especially true as to septum ventriculi defects, which led Kussmaul to a classification of the lesions and defects of the pulmonary arterial tract as follows:—

(1) Stenosis or atresia of the pulmonary arterial tract with closed ventricular septum.

(2) Stenosis or atresia with open ventricular septum.

(3) Combined stenosis and atresia with open ventricular septum.

The term pulmonary arterial tract is used because the lesion or defect may be in the conus, the pulmonary orifice with its valves, or in the artery.

In the first instance, the lesion of the pulmonary valves or artery has occurred at a period of fetal development when the ventricular septum had already closed, namely, after the third month. If the lesion was a slight stenosis there may be no other defect, provided compensation was well established. If, however, it be an atresia, the right ventricle may be undeveloped, the auricle greatly dilated and the foramen ovale wide open, likewise the ductus arteriosus, through which, from the aorta, the lungs will be supplied with blood.

In the second instance, the defect in the pulmonary arterial tract has occurred at a period of fetal development, namely, before the third month, when the ventricular septum had not closed, and, according to H. Meyer, as a result of stasis in the right heart, remains open.

In these cases the conus may be the seat of the stenosis, and the pulmonary orifice and artery only secondarily narrowed; or with a slight narrowing of the conus there may be stenosis of the valves, or even atresia. In the latter event the septum defect will be large, the ductus arteriosus will be patent and the foramen ovale may or may not remain open.

In the third division there may be a combined stenosis and atresia with open septum and various anomalies in the origin of the aorta, also trilocular or bilocular heart.

The clinical differentiation of these varying conditions, all of which show most beautifully the wonderful compensatory capacity of the cardiovascular system, is in great measure impractical, as they may all present similar physical signs except in the atresias of the pulmonary tract, the right ventricle may remain undeveloped, and auscultatory signs may vary.

The clinical picture of these congenital lesions and defects will necessarily depend on their nature and extent and the degree of compensation. There are some symptoms more or less common to all of them, and those are symptoms dependent on venous stasis and insufficiently oxygenated blood. Among these may be mentioned cyanosis, coolness of body surface and muscular weakness. Cyanosis, however, is not always a pronounced symptom, as he had occasion to observe in a lad of about eleven years, who had but a slight bluish tint of the mucosa. The diagnosis of pulmonary stenosis, congenital in origin, with an acute septic endocarditis of the pulmonary valves, was ventured in this case and was verified at autopsy. It is possible that the anemia present was to some degree responsible for the slight cyanosis.

Dr. Butler has had 2 other cases under observation for several years, in whom the cyanosis is not more marked than would be found with a mitral stenosis. The stenoses are undoubtedly of mild grade with undisturbed compensation. A pronounced cyanosis, however, is not necessarily a grave prognostic sign of early termination, as he had opportunity of seeing a boy of nineteen years whose body surface was almost purple.

In severe cases, especially those that succumb early, the cyanosis is intensified on any effort, as in crying, fainting spells, apoplectic seizure, and even convulsions are not uncommon, often ushering in a fatal termination.

More favorable cases that survive the first months or years are

prone to periods of incompensation, the result of intercurrent infections, endocarditis or heart fatigue, and present the picture of more or less severe cardiac incompetency, during which they may succumb, or recover only to suffer later attacks, and in one instance that came under his notice, a young man of twenty-six years presented the clinical picture of chronic cardiac incompensation, with general hydrops and a cyanotic cirrhotic liver.

A striking feature of these cases during periods of incompensation is that they are somnolent, sleeping a great part of the time. Hemorrhages from the mucosa are not uncommon at any period of a pulmonary stenosis.

A danger to which all cases of pulmonary stenoses are exposed, because of the chronic anemia of the lungs, a natural consequence of the condition, is pulmonary tuberculosis, of which he had an opportunity to see a case in Neusser's clinic, in a girl of seventeen years, in whom both upper lobes were involved. In this connection, attention might be called to the fact that lesions of the pulmonary valves hold a diametrically opposite position to those of the mitral with regard to pulmonary tuberculosis. In the former an obstruction to the entrance of blood into the pulmonary circulation exists, producing a chronic anemia, favorable to the development of tuberculosis; in the latter there is an obstruction to the escape of blood from the pulmonary circulation, producing a passive hyperemia unfavorable to the development or to the activity of an already existing tuberculosis.

In regard to the physical diagnosis of pulmonary stenosis, the signs are so uniform (this does not include the atresias) that when once seen they are easy thereafter of recognition.

There is usually a prominence of the chest wall to the left and under part of the sternum commensurate with the hypertrophy of the right ventricle. The apex is not displaced unless the right heart attains a large size and pushes it over. Dr. Butler would lay stress on the point that the left ventricle is not enlarged. The first tone may be heard at the apex or it may be obscured by the loud, rasping, sawing systolic murmur which latter reaches its greatest intensity over the third and second intercostal spaces and third rib, although it is sometimes heard anywhere on the trunk. The second pulmonic tone may be greatly diminished in intensity or appear quite loud, the latter suggesting an open ductus arteriosus. The murmur in some cases may be

heard, as in the dusky skinned boy above referred to, two or three feet or more removed from the patient. He complained of the noise coming from his chest, which he said was a constant annoyance.

A thrill invariably accompanies this murmur, its intensity corresponding with that of the latter.

The prognosis of these cases depends entirely on the nature and extent of the lesion and the degree of compensation and the persistence with which same is maintained. Of the atresias 66 per cent. die in the first year, 18 per cent. between the first and fifth year. It is not improbable in those cases that survive any number of years that the atresia has developed from a recent stenosis. Of the stenoses 17 per cent. die in the first year, 20 per cent. between the first and fifth year, 27 per cent. between the fifth and tenth years and 23 per cent. from the tenth to the twentieth year.

Stolker's statistics of congenital pulmonary stenosis and atresia is of interest. He gives 24 per cent. dying in first six months; 42 per cent. die before the tenth year, and 15 per cent. live over twenty years.

Referring to the case presented by Dr. Michael, it shows a severe chronic venous stasis, as evidenced by the cyanosis of the mucosa and skin and the clubbing of the fingers. The heart seems to be enlarged on both sides. This, of course, would suggest a lesion in the left heart.

In the event of a pulmonary stenosis here, there had in all probability developed, possibly at the time of the whooping-cough, an acute endocarditis in the left heart with a resulting insufficiency of the aorta as instanced by the apex dropping to the sixth interspace and the presence of a soft diastolic murmur heard best up along the sternum. It is not beyond the range of possibilities that this loud second pulmonic tone is associated with a mitral lesion. Mitral systolic murmurs are sometimes heard best toward the base.

It is a matter of observation that high-grade valvular lesions developing out of acute endocarditis in early childhood may result in very much enlarged hearts, especially where the myocardium has suffered in the acute infection, and in this case bore the effect of the venous congestions in whooping-cough paroxysms. Under such circumstances the disabled myocardium may never fully com-

pensate such lesions, and as a consequence may be constantly on the edge of incompensation, with occasional periods of same, or suffer a chronic incompensation.

In this case there seems to be, in addition to any congenital defect, also acquired lesions of the valves of the left heart.

DR. H. W. CHENEY presented a child who had had

CONGENITAL PYLORIC STENOSIS: OPERATION, FOLLOWED BY
RECOVERY.

This disease, although rare, is occasionally encountered, and therefore we should be familiar with its various phases. The number of cases on record is about 160.

It occurs most frequently in well-nourished, breast-fed infants, and not immediately after birth, but some days or weeks later. The earliest onset of symptoms reported was the first day, the latest about the eighth week.

In the recorded cases boys have been more frequently affected than girls.

The clinical picture is usually more or less uniform. A healthy child begins at the age of a few days or a few weeks to vomit without apparent or recognizable cause, and the vomiting remains as the prominent symptom.

Other symptoms depend more or less on this, such as decrease in the quantity of urine and feces and rapid loss in weight.

In most cases these symptoms increase in severity and the child dies, practically of starvation, in a few weeks or months.

In a few cases the course is more favorable and these go on to recovery, even after the most distressing symptoms.

Etiology.—Practically nothing is known about the etiology. As the disease occurs in the youngest and apparently healthy infants, it is probable that digestive disturbances or diseases of the intestinal mucous membrane have little or nothing to do with its causation.

The condition may be an error in development, because cases have been recorded in which there was congenitally a complete closure of the pylorus.

Pathology.—According to the opinions as to the nature of the disease advanced by different observers, the pathological conditions divide themselves into three classes:—

(1) A more or less persistent *muscular spasm* of the muscular fibres of the pylorus and not a true hypertrophy.

Undoubtedly this is the condition in a certain percentage of the cases, and I believe with those authors who say that this is a separate disease and should be called *congenital pyloric spasm* and not hypertrophy.

(2) A *primary hypertrophy* of the *mucosa* and *muscular fibres* of the pylorus—a developmental defect or malformation.

(3) A *secondary* hypertrophy of the muscle, dependent on or due to another cause, such as continued pyloric spasm, erosions or fissures of the mucous membrane, hyperchlorhydria, etc.

The second and third classes really constitute the true hypertrophic pyloric stenosis.

(1) *Vomiting*.—This is the first and most prominent symptom. It may begin when the babe is a few days old, or the child may be perfectly well for a few weeks, and then the vomiting begins suddenly. In the case here reported the babe was four weeks old when the vomiting began. The vomiting is occasional at first; later it occurs oftener, and finally after every feeding, either immediately or following in an hour or two and is explosive in character. The quantity vomited may be small, but often the remains of several feedings accumulate and are discharged in large amounts at one time. In persistent cases the whole of every feeding is thrown up almost as soon as taken.

The vomited matter consists of the milk, more or less digested, according to the time it remained in the stomach. *Bile*, as a rule, is never vomited.

(2) *Character of Stools*.—The bowel movements may be almost entirely absent, or if occurring are small in quantity and contain little or no food remains. The stools consist largely of mucus, and may be slimy and dark brown or gelatinous and dark green, possibly resembling a meconium stool.

The urine secretion also is diminished or almost absent

(3) A continuous and rapid *loss in weight* and *strength* of the child caused, of course, by the starvation.

(4) *Form of the Abdomen*.—The lower half is flat or sunken in, while over the epigastric region it is somewhat distended.

(5) *Peristaltic Movements of the Dilated Stomach*.—This symptom is rarely absent and consists of a visible swelling or bulging forward of the abdominal wall over the stomach, which

condition appears and disappears. Or, a furrow may divide the swelling into two peristaltic waves, which arise under the ribs on the left side and pass slowly across the upper abdomen and disappear at the edge of the liver. These waves pass from left to right and are caused by the contractions of the dilated stomach working against the closed pylorus.

(6) A small *movable tumor* can sometimes be felt in the region of the pylorus. This may be about the size of a hickory-nut, and when palpable is a most valuable diagnosis sign.

In the form of the disease designated by some authors as *pyloric spasm*, the symptom complex is similar, though not so marked. The vomiting is not so regular or continuous nor so explosive, perhaps resembling more a regurgitation.

There may be periods, possibly a day at a time, when the child does not vomit. The loss in weight is therefore not so rapid nor so marked. Diarrhea may alternate with obstipation. Visible peristaltic movements may rarely be present, but the pyloric tumor almost never.

As a whole, the symptoms of spasm of the pylorus do not seem to be so urgent nor the unfavorable course of the disease so rapid.

Diagnosis.—The essential symptoms on which the diagnosis should rest are: The persistent vomiting, obstipation, emaciation, visible peristaltic waves over the stomach, pyloric tumor.

The last two symptoms are conclusive, and in the absence of both of them one would hardly feel justified in making a positive diagnosis.

One must differentiate hypertrophic stenosis of the pylorus from:—

(1) The *simple spastic* form in which the symptoms are all of a milder type, with perhaps an occasional remission of all alarming symptoms.

(2) The very rare condition of *congenital atresia* of the *pylorus* or absence of any opening whatever in which the most severe symptoms appear from the very first day of life and lead quickly to a fatal termination.

(3) A congenital narrowing or closure of the duodenum, in which the vomiting of bile is the differentiating point.

We need hardly consider the differentiation of chronic in-

digestion, peritonitis or meningitis for a careful consideration of the clinical picture of each will set us right.

Prognosis.—This disease is a most serious one, and nearly all positive cases are fatal unless the stenosis is relieved by surgical intervention.

In the occasional cases which recover without operation the question can usually be raised as to the accuracy of diagnosis.

Statistics founded on recoveries in non-operative cases are therefore unreliable, because of the uncertainty of diagnosis.

Heubner, of Berlin, does not consider the trouble so serious and reports some cases as recovering under palliative treatment alone. These may have been the simple spasmodic form. The majority of opinion, however, is that true cases of hypertrophic stenosis end regularly in death in a few weeks or months unless treated surgically.

Treatment—In the beginning of all cases, the diagnosis between the true hypertrophic and the spastic form will probably be in doubt for a few days or longer, until the symptoms are positive enough to decide. During this time a line of treatment more or less dietetic and medical can be carried out.

If the child is breast-fed this nourishment should be continued, but allow only one-half or one-third of the usual quantity to be nursed, and perhaps shorten the nursing intervals. If not successful, the child should be tried, if possible, at the breast of another nursing mother to see if it also vomits that milk.

If the child is too weak to suckle, it should be fed mother's milk with a spoon, or if necessary through an esophageal tube.

If the child is artificially fed, it should receive small quantities of a proper food at frequent intervals, perhaps every two hours, and the food should be given after the child has vomited if it is possible to do so. We should try to ascertain just the quantity the stomach will hold without vomiting and then endeavor gradually to increase this. If no food is retained in the stomach rectal feeding may be resorted to.

A valuable procedure is the regular washing out of the stomach. This should be done two or more times a day with the usual apparatus and warm sterile water or a 3 per cent. sodium bicarbonate solution. After the washing should follow the feeding.

Protracted warm baths may be tried, also hot applications over the epigastrium.

Medicine is probably of little value. Minute doses of morphin and atropin may be tried with the possible effect in view of relieving the spasm.

Lime-water or sodium bicarbonate has been recommended to counteract the hyperacidity often present.

Laxatives should not be given.

Surgical Treatment.—Three types of operation have been done for this condition, namely:—

- (1) Gastroenterostomy, which is the choice of most surgeons.
- (2) Pyloroplasty, a plastic operation on the pylorus.
- (3) Divulsion or the Loreta operation, which consists in incising the stomach and endeavoring to dilate the pylorus with forceps.

*Dr. Geo. F. Thompson, of this city, in a recent article has collected all the recorded cases of surgical treatment of this disease. He finds a total of 89 cases operated on, which includes the case here reported. Of these, pylorotomy was done once with a fatal result; pyloroplasty was done twelve times with six recoveries; divulsion was done seventeen times with eight recoveries; gastroenterostomy was done fifty-nine times with twenty-nine recoveries.

This gives 89 cases in all, with forty-three recoveries or about 54 per cent. cured, which is an excellent showing for such a serious condition.

The operation of gastroenterostomy is growing more in favor, and I believe, other things being equal, will become the operation of choice.

For us, it is most important to bear in mind that this condition exists in infancy; that it may often be mistaken for chronic indigestion; that it is evidently far more common than has previously been thought; that the medical treatment is disappointing, to say the least; that the results of surgical treatment are most encouraging, and that we should not hesitate to urge a prompt operation in every case as soon as the diagnosis is positive.

As an example of a typical case of hypertrophic stenosis of the pylorus in which a successful operation was done, I wish to detail the following history:—

This boy baby was born one year ago, the second child of healthy parents. The first child, also a boy, was nursed by the mother and is living and well.

This baby had a normal delivery and weighed 8 pounds. The

mother had plenty of milk, and this nourishment seemed to agree with the child well; occasionally some regurgitation; stools normal. At the end of a month he weighed 9 pounds.

When the babe was four and one-half weeks old he vomited two or three times that day.

Second day.—He vomited several times and the father came to see Dr. Cheney about it. Thinking it might be an acute indigestion he prescribed the usual calomel in tenth grain doses.

Third day.—Child vomited oftener, usually after a feeding. Stopping the breast entirely for a day and giving barley-water was directed.

Fourth day.—Breast-feeding again, but allowed only a small quantity each time, baby to nurse but five minutes at each nursing.

Fifth day.—Nursing continued and allowed the child to have a larger quantity than the day before. Vomiting now occurred regularly soon after each feeding.

Sixth day.—Babe appeared to have lost in weight. Mouth, tongue and throat normal. Heart and lungs negative. Abdomen slightly distended; no tumor palpable.

Urine reported small in quantity and bowel movements very slight or none at all.

A small esophageal tube was passed and the child's stomach washed out with warm sodium bicarbonate solution.

At this time the opinion was formed that the case was not an ordinary gastritis or indigestion, but that it might be pyloric stenosis.

Seventh day.—Peristaltic waves over the stomach noticed for the first time. Child had lost two pounds in weight during the week's illness. Vomiting persistent and explosive at times.

Dr. J. A. Capps and Dr. A. D. Bevan examined the child on this day, and an operation was decided on. It was taken to the hospital and operated on by Dr. Bevan the morning of the eighth day after the appearance of the first symptoms. The date of the operation was December 10, 1905.

Operation.—Under chloroform anesthesia a median incision was made and the stomach and duodenum brought out of the opening.

At the site of the pylorus was a firm, somewhat hard, rounded and rather elongated mass the size of a hickory-nut. A gastro-enterostomy was quickly done, the coaptation made by two rows

of sutures. The stomach and intestines were then dropped back, the external wound closed and the child returned to bed in good condition.

There was no recurrence of the vomiting after the operation. Three hours later there was a brown liquid stool and fifteen hours later a yellowish bowel movement. After this the bowels moved two or three times each day, more or less natural in character. The temperature was $102\frac{1}{2}$ on the first day.

After the third day the temperature was normal. The child was fed by enema the first day, and thereafter was allowed to nurse from the mother, a small quantity at first, gradually increasing later. It left the hospital the sixth day after the operation. The mother continued nursing the baby, and he thrived fairly well, although he did not gain so fast as the normal.

After the second month he was fed a mixture once or twice daily in addition to the breast-feeding.

When he was about eight months old, the mother had to give up nursing him entirely because her milk failed.

Ever since the operation the bowels were inclined to be loose, three movements a day being the average; some days four or five, but yellowish in color and fairly well formed.

During the summer the family were away from the city, and the babe, not having the careful attention necessary, was fed improper milk mixtures, and developed a subacute indigestion, with diarrhea and loss in weight. Soon after return to the city in September, the child was found to be having a movement of the bowels after every feeding; within ten or fifteen minutes the curded milk would come through almost unchanged. The boy was ravenously hungry, fretful crying and emaciated, his weight having fallen to twelve pounds.

It was thought that the gastric and intestinal mucous membrane had become so irritated on account of the enteritis that the abnormal opening between the stomach and the bowel did not allow the food to remain long enough in the stomach, and that it literally ran through the patient without being digested or absorbed.

The outlook for the boy at this time was exceedingly grave. He was put on a half-milk, half-barley-water mixture, and ten grains of bismuth subnitrate given before each feeding to control, if possible, the diarrhea. This was not effective, the movements

being but slightly checked and some of the powdered bismuth appearing unchanged in the stool.

Then five drops of the camphorated tincture of opium was given half an hour before each feeding. This controlled the excessive peristalsis and limited the movements to one or two a day.

The boy began to gain in weight and the stools to be more natural. The opium was continued for about two weeks, gradually reducing the dose. The proportion of milk in the food was increased until at the age of eleven months he was taking whole milk and gaining regularly in weight. He now has an average of three movements a day, well formed, pasty and yellowish in color.

He is able to eat crackers, toast, and is beginning to take small amounts of egg.

His condition is satisfactory, and he weighs sixteen pounds.

PSEUDOHYPERTROPHIC MUSCULAR PARALYSIS.

DR. J. C. COOK presented this patient. He said: A group of clinical forms that have in common the feature of progressive muscular weakness and atrophy, often associated with hypertrophy or pseudohypertrophy of some muscles, has recently, from the viewpoint of a clinician, undergone some changes. When it was first found that such cases presented no spinal lesion, they were termed *progressive muscular dystrophies* by Erb, and *primitive progressive myopathies* by Charcot. Writers also refer to the *pseudohypertrophic* form, the *brachial*, *facioscapulohumeral*, *pelvic*, and *peroneal* types, according as hypertrophy prevails or the atrophy is most pronounced in the various indicated regions. As material has accumulated, transition forms have been encountered with increasing frequency. Two or more of the foregoing types have been found in the same patient or in members of the same family. The same family has presented cases of progressive muscular atrophy of the spinal form and also of the so-called idiopathic muscular variety in one or in succeeding generations. The so-called peroneal or neurotic type furnishes an intermediate form between the spinal and the alleged purely muscular varieties. This alone compels an acknowledgment of the spinal factor.

Sainton has found well-marked changes in the spinal cord in the neurotic form, and Abadie and Denoyes, in a typical pseudohypertrophic case, found the reactions of degeneration that are supposed to be a part of spinal and nerve disintegration. Every

gradation, from progressive spinal muscular atrophy to cases only showing muscular changes, can be adduced. Some observers insist that the spinal changes are secondary to the muscular atrophy. These muscular atrophies seem to have in common a familial tendency. They often appear in several members of a given family or in blood relations of the same or different generations. While they may appear at any age, they show a marked tendency to occur in the early years of life, and commonly affect the roots of the extremities rather than their distal ends. They are almost always unmarked by changes of sensibility, by fibrillar twitchings, and by the electrical reactions of degeneration.

The muscles show various morphological changes, depending upon the presence of hypertrophy, pseudohypertrophy or atrophy—the final and logical end for all the affected muscles. Enlarged fibres may be found in a mass of greatly wasted muscular tissue. There is round-cell infiltration, vacuolation, splitting, division, and longitudinal striation of muscle fibres, with hyperplasia of connective tissue and an increase in fat that may reach the highest degree of lipomatosis. The early changes consist of increase of connective tissue, possibly some muscular hypertrophy, then atrophy and fatty infiltration.

Regarding the causation of these progressive myopathic atrophies very little can be positively stated. Their appearance in several members of the same family or in several members of succeeding generations, their interchangeability of form, their propagation by the females, their appearance during the age of active growth and at developmental epochs of life, stamp them as hereditary, familial and embryonic. Meek has demonstrated that newborn animals possess many more muscle fibres than adults—as, for instance, in the biceps—and Pick suggests that in some instances this natural disappearance of muscle fibres may, from prenatal or other cause, exceed physiological limits and produce progressive dystrophy. The great majority of cases appear before puberty is established, with especial frequency during the second dentition and at pubescence. As males are rendered impotent by the disease, its transmission necessarily falls to those females of the family who escape and reach maturity. Boys seem more frequently affected than girls, it appearing commonly during the early childhood and frequently following some of the exanthematous diseases.

The earliest and most common symptom is that of weakness. The gait is broadbased and waddling. The foot to be advanced is clumsily put forward, the pelvis tilting sharply downward on that side, the body being inclined over the supporting foot as a counterpoise to the swinging limb. This is repeated in the opposite sense at the next step, and the patient advances in a swaying, waddling, awkward fashion, stumbling over the least obstacle, and falling heavily if the very unstable equilibrium is momentarily lost. The difficulty with which they mount stairs is often an early indication of the onset of the disease.

The manner of rising from the ground is most characteristic. If placed on the back, the patient may have great difficulty in rising at all. His usual plan is to turn over on his face, then huddle himself together, and get upon his knees. He advances the body into the "all fours" position, and carrying the weight of the head and shoulders on the arms, pushes up the lower end of the trunk with his legs, as a cow rises. The hands are now brought toward the feet, one is placed above the knee on the same side, then the other at a higher point on the thigh of its own side; the shoulders and head are pushed upward, the pelvis tilts forward, the swayback suddenly appears, and the patient attains the erect attitude by a process of climbing up his own legs.

The case presented to-night is one of the earliest recognized forms, designated as pseudohypertrophic paralysis. It usually appears in early childhood, attacking boys more frequently than girls, and is marked by extreme enlargement of the calves and buttocks. These stand out in bold relief next the wasted thighs and forward-tilted pelvis. The psoas group is early affected, rendering going upstairs difficult at an early date.

A number of varieties have appeared in the literature, as the juvenile type of Erb, also called the brachial form, affects mainly the muscles of the arms and shoulders, and appears in early youth, and usually in several members of the same family.

The facioscapulohumeral form, or the type of Landouzy-Déjerine, affects face, shoulder and arm, or may be considered as the brachial form plus facial involvement.

Several of these forms may be present in the same patient, as the leg type with the facioscapulohumeral variety, or pseudohypertrophy in the legs, and the brachial type.

The patient is nine and one-half years old, and was seen be-

cause of a clumsy gait. ("Seems to be weak in his legs.") This condition has been present ever since he began to walk.

Personal History.—He is the oldest of four children. The labor was easy, apparently especially so for the first child. He was nursed at the breast; has never been sick, except some eight months ago, when he had an attack of measles. He was as intelligent as the ordinary child, talking when about fifteen months old. Never had any spasms. His walking was delayed till about twenty-six or twenty-seven months old. He started to school at the age of seven and is now in the second grade.

On inquiry, the remaining three younger children appear to be free from any nervous taint. The father's health is reported good. Further inquiry into his history (family) is impossible. By nationality he is a Russian Jew. The mother's health is also good. She is of the same nationality. She has had no miscarriages. Her only complaint is occasional attacks of migraine. She has four brothers and sisters. Nervous disease in any of these is denied. The maternal grandfather, since he was in his thirties, has suffered with monoarticular arthritis deformans. He also shows some mental symptoms, chiefly of a melancholic tendency. He also has a marked hesitancy in his speech.

Physical Examination.—With the clothes on the boy appears near the average height and fairly well nourished. The pupils are large and respond readily to light. The eyelids show no weakness; the face is intelligent. He has a marked adenoid appearance and there is a large mass in the nasopharynx. The masseter jerk is present. The palate is high, the teeth are irregular, the tongue is protruded in a straight line; there are no tremors. It is large, red and clean; shows some tendency to fissures. The tonsils are enlarged. The skin is dry and mottled, very readily assuming the "goose flesh" character. The hands and feet are always cold.

The chest is well formed, but shows striking results of the atrophy. The heart and lungs are normal. The blood examination is absolutely negative. The neck is well formed and shows little atrophy. The scapulas wing out from the chest. The infrascapular muscles show marked atrophy. The suprascapular seem unaffected. The deltoids show marked atrophy, it being very easy to outline the shoulder joint. The triceps and biceps, as well as the muscles of the forearms and hands, show atrophy.

The strength of these muscles is markedly diminished. I have been unable to obtain any reflex at the triceps or the wrist. They show no reaction to electric currents except when strong. There seems to be about an equal quantitative reduction to both galvanic and faradic currents. Tactile sensibility as well as thermic sensibility is unchanged.

The spine shows an anterior curvature in the lumbar region. The buttocks are not atrophied. The thigh shares in the general atrophy, measuring eleven inches about the middle, while the calf of the leg measures ten and a half inches. The knee jerk is absent.

The gastrocnemii show marked pseudohypertrophy. These muscles feel hard and appear well nourished, but show remarkable weakness in comparison to their size. The Achilles jerk is present.

The attitude to some extent is characteristic. The feet are usually apart; the pelvis is tipped forward, and there is a marked curve put in the lumbar spine to put the rest of the body in balance. The gait is clumsy, the lad stumbling over small objects readily. He shows almost a total inability to climb stairs.

His method of arising is characteristic. On placing the boy in a crouching position with the buttocks on the heels and knees bent, he is almost helpless, but, struggling and twisting, he manages to throw himself forward on his hands; then he straightens the legs and, keeping them so, he places one hand on the knee, then places the other hand a little above the knee, and by sundry twists and squirms finally crawls up on his thighs till he assumes an upright posture.

Prognosis.—The prognosis is always unfavorable. The severity of the disease falls upon the respiratory and circulatory apparatus. Many succumb to intercurrent diseases easily.

Treatment.—The only treatment is well-selected and well-directed muscular exercise. Massage has proven beneficial, and, with general measures pertaining to the health and comfort of the patient, is all that can be promised.

In concluding, Dr. Cook acknowledges his indebtedness to Church and Peterson for general information, and to Dr. R. A. Black for personal history.

Dr. J. H. Hess reported a case of

EXSTROPHY OF THE BLADDER AND ONE OF "HORSESHOE KIDNEY,"

and presented specimens. These specimens he considered pathologically rather than clinically interesting.

The first specimen, horseshoe kidney, he said is a rare condition. Dr. Holt reports 4 cases in 726 autopsies. He also states that in about this number of autopsies in another institution only 1 case of kidney deformity was found, while in another group of a similar number of autopsies none were found.

Cohesion of the two kidneys most frequently takes the form of the so-called horseshoe kidney, in which the organs are found closer to each other than is normal, and their lower ends are united by a fibrous band or by ordinary renal tissue. Cohesion of the upper or middle parts, or of the mesial borders, is much rarer.

More intimate fusion of the two kidneys into one is usually associated with considerable displacement or dystopia.

His case presented an isthmus of true renal tissue. There are two apparently normal ureters and renal arteries. There was a downward displacement of the kidneys in this child and some displacement to the left.

The case clinically was of considerable interest in that it probably represents a death due to an overdose of bromidia. The child, ten months old, was passing through a period of teething, and was very restless, and the mother gave it 36 drops of bromidia within three hours. (Formulæ chloral hydrate, 15 grains; bromids, 15 grains, and extracts of hyoscyamus and cannabis indicus of each grain $\frac{1}{8}$ to the drachm.) Shortly after, the child suffered from collapse, became cyanotic, pulse 180 and respirations 80, with death without showing any response to stimulation.

The second case is of pathological interest only, and represents an exstrophy of the bladder. The child was a breech presentation with asphyxiation during the delivery of the after-coming head. The protruding mass represents the surface of the posterior bladder wall, the anterior wall being entirely absent.

The ureters open into the lower angle of the bladder wall. There is also present a congenital atresia of the vagina. These cases are due to defective development of the allantois, and are seen as simple separation of the symphysis without fissure of skin or bladder; secondarily, separation of the skin; third, separation of skin and anterior bladder wall, as in our case; and fourth, as in the preceding, with also a separation of the posterior bladder wall.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. J. HOWLAND,
DR. W. A. DUNCHEL,

DR. L. C. AGER,
DR. ALFRED F. HESS.

MEDICINE.

Hutchinson, Jonathan: A Clinical Lecture on the Transmission of Syphilis to the Third Generation. (*Medical Press and Circular*, August 1, 1906, p. 110.)

This lecture is devoted to generalities rather than to details, but the author places himself on record as decidedly opposed to the belief that parents, the subjects of hereditary syphilis, can convey the disease to their offspring.

J. HOWLAND.

Baginsky, Adolf: Kinderheilkunde als Specialität (Pediatrics as a Specialty). (*Archiv. für Kinderhk.*, Vol. xlv., Band 1-3, Heft, p. 178.)

This article is an answer to one by Quincke, of Kiel, which appeared in Nos. 25 and 26 of the *Münchener Medizinische Wochenschrift*. Quincke therein deplored the existence of a pediatric specialty except during the first few months of life, and of special hospitals and clinics for children beyond the third year. Baginsky answers him with great care. He shows the development of pediatrics to have been one of necessity, and that from economical as well as educational grounds children's hospitals and clinics are required. He insists that there is a most important place to be filled by those especially trained in the diseases of infants and children, and points to the advances that have been made by those engaged in this specialty. The article is well worth reading by those interested in pediatrics.

J. HOWLAND.

Zahorsky, John: Acute Infections of the Urinary Tract in Infants. (*St. Louis Courier of Medicine*, May, 1906, p. 286.)

The writer reports 4 cases in females of one year, one year and four months, two years and three and one-half years. The clinical picture was one of sharp febrile reaction, lasting from three to fourteen days. In 1 case there was frequent voiding of urine, and in another painful micturition. The urine was acid, and the findings were albumin, pus, squamous epithelium and, in 1 case, pyramidal cells. The writer believes that the rapid convalescence suggests a colon bacillus infection. No cultures were made. In 1 case conical cells were present in sufficient number to suggest a pyelitis.

W. A. DUNCHEL.

SURGERY.

Swain, Jas.: Difficulties in the Surgical Diagnosis and Treatment of Cases Associated with Vomiting in Children. (*Bristol Medico-Chirurgical Journal*, June, 1906, p. 116.)

The author states that he has always found it a safe surgical practice to open the abdomen without delay in cases of doubtful diagnosis where vomiting is associated with a gradually increasing tympanites. Tympanites, however, is apt to be absent in intussusception in children, which renders the diagnosis at times obscure, especially as in more than half the cases a tumor cannot be felt, and in 20 per cent. there is no passage of blood-stained mucus.

He then cites 3 cases in which he made an exploratory incision without finding the cause of the vomiting. He thinks the first two—one fatal and one recovery—were cases of cyclical vomiting. [This seems quite evident from the symptoms.] The third case, also fatal, showed a slight intussusception, but the author thinks that the real cause of death was the severe gastro-enteritis present. He says, further, "The chief point of interest to the surgeon is how to recognize cases of cyclical vomiting," and emphasizes the importance of the examination for acetonuria.

[If Herter's claim that acetonuria is always present in starvation is true, we might expect to find it in cases of prolonged vomiting due to intussusception.]

L. C. AGER.

HYGIENE AND THERAPEUTICS.

Guedras, M.: A Study of the Transmission of Tuberculosis by Means of Casein Food Stuff. (*Le Bulletin Médical*, July 4, 1906, p. 605.)

An account of the great food value of casein. Many infants' foods have this as their basis. The author therefore considered it of value to ascertain whether commercially prepared casein may, in spite of repeated precipitation and dessication, contain virulent tubercle bacilli. His results showed that casein prepared from milk of tuberculous cows is able to cause tuberculosis in guinea-pigs, and that we should not be careless in the selection of milk used for such commercial purposes.

ALFRED F. HESS.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

MARCH, 1907.

[No. 3.]

Original Communications.

ANEMIA INFANTUM PSEUDOLEUKEMICA (VON JAKSCH).—MARKED ANEMIA, WITH ENLARGEMENT OF THE SPLEEN AND LIVER, IN INFANCY AND CHILDHOOD.*

BY HENRY KOPLIK, M.D.,
New York.

Anemia infantum pseudoleukemica is a symptom complex, into which a certain amount of confusion has been introduced by the variety of descriptions of the condition which have crept into the literature. When Von Jaksch first described this condition in children, he thought it was a primary blood disease peculiar to these young individuals. At the time Von Jaksch published his first case, the blood in infancy and childhood had not as yet been thoroughly studied or analyzed. Since then the blood in these young individuals has been so thoroughly studied, in various conditions, that we can now see how some of the assumptions of the earlier authors were incorrect, and how confusion was thus introduced into the literature in connection with this disease.

Von Jaksch described his first case in 1889, and thought the condition which he named "anemia pseudo-leukemica infantum," was a specific primary anemia, in which there was oligocythemia, oligochromemia, a high degree of leukocytosis, a tumor of the spleen, swelling of the lymph nodes and moderate swelling of the liver. Following the description of this case, there have been published, at various times in the literature, cases either similar or corresponding in every detail to the case described by Von Jaksch. Monti, among others, undertook to specify conditions of the blood in these cases, and he characterizes the blood as being reduced in specific gravity with a diminution of the hemoglobin, a diminution of the red blood cells, a high degree of

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 31, 1906.

leukocytosis, and an inequality in the size of the red blood cells, poikilocytosis, microcythemia, and the presence of a variable number of nucleated red blood cells. These, combined with the enlargement of the spleen, moderate enlargement of the liver, Monti thought made up a specific symptom complex, primary in its nature, and easily recognizable at the bedside.

Following Monti there were cases published by Tessier, Adenoud, Glöckner, Vickery and others. All these authors still adhered to the original idea of Von Jaksch, that they had to deal with a primary specific condition or disease of the blood.

Fowler, in a paper on "Splenic Anemia in Infancy," in 1892, in the *British Medical Journal*, gives an analysis of a number of his cases in which the spleen was enlarged, and which in every respect, including the blood picture, corresponded quite accurately with those described by Von Jaksch. This author gives the interesting information that Gee in 1867 referred to a condition in children similar to that described by Von Jaksch, and proposed for this condition the name of lymphatic anemia.

We may say here that Wilks is another English author who proposed for this condition a similar name.

Returning to Fowler's work, he concludes that the picture of an enlarged spleen present in infancy and childhood with a definite blood picture as described by Von Jaksch, both severe and mild in form, should be grouped as primary splenic anemia.

In order to correctly understand the subsequent trend of the literature on this subject, it is necessary to state here that the original idea of Von Jaksch, that there must be a leukocytosis in all of these cases, has now been generally abandoned; for certain undoubted cases have been published which correspond quite accurately in the clinical picture to those described by Von Jaksch, which at certain periods of the disease did not show a leukocytosis.

In 1892 Fischl ventured the opinion that "anemia pseudo-leukemica infantum" was a secondary anemia, and tried to explain the confusion in the blood conditions published in connection with these cases by the fact that in infancy the microscopic picture of the blood in various forms of anemia is changeable, and showed distinctly that it was impossible to make a diagnosis from the blood picture in infancy alone—at least, in this set of cases. He described, also, severe cases of rachitis, in which the blood pictures were similar to those described by Von Jaksch,

Luzet and others, and in which autopsy showed a similar condition of the spleen—that of hyperplasia.

Epstein, also, considers this condition a secondary anemia, and the occurrence of large numbers of normoblasts and megaloblasts as evidence of mytosis of the nuclei. The presence, also, of poikilocytosis and polychromatophilia simply indicates a more or less severe disturbance of the functions of the blood-making organs depending to a degree on the condition found in the cells.

Stengel, in his article in the *Twentieth Century*, is inclined to believe that anemia pseudoleukemica infantum is an independent primary disease. In a later paper on splenic anemia, however, he is not quite so clear as to the primary nature of these conditions, and mentions the fact that the splenic enlargement in these cases overshadows the importance of the underlying original dyscrasia.

The next work of moment in connection with this condition or symptom complex is that of Wentworth. It seemed to Wentworth that "the anemia splenica infectiva" of the Italian authors, and the "anemia infantum pseudoleukemica" of the German authors and English writers were identical; that they were forms of a secondary anemia, and that they derived their peculiar symptomatology and blood pictures from the fact that this anemia occurred at an early age of life. There is very little proof, according to Wentworth, that this condition is a primary disease of the spleen or of the blood, and he also thinks there is no connection between the character of the blood and the splenic changes in these cases. Cases with identical lesions in the spleen, namely, that of chronic hyperplasia, show varying degrees of anemia. At times, as has been mentioned in this paper, the changes are marked, and at others they are not so definite. The same may be said of the leukocytosis.

Morse, in a paper on "The Relation of Chronic Enlargement of the Spleen to Anemia in Infancy," grouped a series of cases of malnutrition, some 20 in number, in which the spleen was either palpable or extended 2 or 4 centimetres below the free borders of the ribs. In 2 cases the spleen extended as far as the anterior superior spine and the umbilicus. The greater number of these cases were affected with a mild anemia. In only 2 cases did the hemoglobin fall below 20 per cent. The majority of the cases, however, were not severe anemia. Confusion is therefore introduced by the attempt of Morse to group the milder and se-

verer cases without pointing out definitely the features, especially in the clinical picture of the cases which correspond to those described by Von Jaksch. His conclusion is that the definition of Von Jaksch's disease as a severe, progressive anemia is misleading, and states that anemia is found in connection with enlarged liver and spleen in infancy, or manifestations of disturbed nutrition.

Among others who have published cases, and who follow more or less the line of thought initiated by Von Jaksch, are Baginsky, Senator, Hock, Schlessinger, Herman, Hutchison, Cozzolina, and finally, Edmund Cautley.

A departure in the consideration of the nature of Von Jaksch's disease was that made by Lehdorf. This author, after an extensive consideration of the literature, Italian, German and French, and influenced especially by the work of French writers, such as Luzet, Weil and Clerc, concludes that in all probability Von Jaksch's anemia infantum is nothing more or less than a type of myelocytic leukemia in children, and is modified in its pathological anatomy and blood picture by the complicating conditions of this period of life, syphilis and rachitis. He agrees with Luzet. Lehdorf was led to this conclusion by a careful study of a case which came under his notice and on which he made an autopsy. The blood showed megaloblasts, megalocytes, poikilocytosis, polychromatophilia; there were nucleated red blood cells in large numbers, and he found, also, what he thought was characteristic—the presence of myelocytes in the blood with mast cells in smaller numbers. He found at all times a polynuclear leukocytosis of the neutrophilic variety, ranging from 53 per cent. to 40 per cent. An examination of the organs postmortem showed a mixed marrow rich in cells; the liver cells were not changed, and there were collections of the lymphoid cells in the liver capillaries. Otherwise the spleen showed an increase of connective tissue; the pulp was rich in blood and infiltrated with large cells. There were eosinophile cells in quite a number; otherwise the changes were not marked.

Following the work of Lehdorf, which was quite extensive and, as has been said, was influenced more or less by the French school of Luzet and Clerc, we have the work of Zelenski and Cybulski. These authors, working in the clinic Jakubowski, undertook to show, and did show quite successfully, that the presence of myelocytes was occasional in the newborn, and that in the first

few weeks of life they were rarely present in the blood or absent entirely. They showed also that myelocytes in infancy and childhood could be found in a variety of diseased conditions in which anemia was present with enlarged spleen, and that they were present in from $1\frac{1}{2}$ per cent. to 17 per cent. of the white blood cells. Thus there is a so-called myelemia in congenital syphilis in rachitis, with enlarged spleen where there is anemia in tuberculosis, in enterocolitis, in pneumonia. Nucleated red blood cells, it may also be mentioned, occur in different conditions, and are not at all characteristic of any one condition. Of 134 cases examined with reference to the presence of nucleated red blood cells, these structures occurred in 36 exclusive of the cases of anemia with enlarged spleen. In these same patients myelocytes occurred in 80 of the 134, but in all the cases of severe anemia with enlarged spleen these authors found normoblasts and megaloblasts. They conclude that the presence of myelocytes in the blood of infants is caused by toxins, and must be interpreted in connection with other conditions common to infancy. They have no diagnostic or prognostic significance, and are apt to be more abundant the younger the infant. The presence in large numbers in the blood of megaloblasts or gigantoblasts is significant of the fact that, though anemia is present, the processes at play in the blood were assuming a rôle of leading importance in the case.

This seems to dispose effectually of the attempt to classify conditions described by Von Jaksch and the others we have mentioned in this paper as a primary blood condition or myelemia. It may be interesting here to show that the attempt of Von Jaksch and Monti to give leading importance to leukocytosis as characteristic of these cases and of diagnostic value cannot be borne out by subsequent investigations of the blood of infancy and childhood. Geissler and Japha, in their investigations on anemia of young children, found that the average number of leukocytes in nurslings was 13,000 to the cubic millimetre, and that this number sometimes increased in the same nursling without apparent cause to 20,000 to the cubic millimetre. The average percentage of multinuclear cells was 42 per cent., and they observed wide variations from 11,200 to 17,000. In other words, we should be very careful in nurslings how we conclude as to the presence of leukocytosis, and that a polynuclear leukocytosis is a necessary accompaniment of anemia.

This investigation was especially prompted by the attempt of Monti to classify anemia of infancy and childhood into that accompanied by leukocytosis and that in which this condition was absent.

Most difficult was the interpretation of the rôle played in the various forms of anemia in infancy and childhood by the enlargement of the spleen, especially in congenital syphilis, where there is considerable enlargement of that organ and in rachitis. According to some authors there is enlargement, where others deny such an enlargement. There are, however—a fact which has been emphasized by others—children who are severely anemic who have no enlarged spleen, and in whom a thorough examination of the blood shows very little change. The same may be said of some forms of anemia with enlarged spleen.

From a consideration of what has been said as to the literature of "anemia infantum pseudoleukemica," it will be seen that there are three distinct directions of thought in regard to this condition of infancy and childhood. The first was that of Von Jaksch, who believed he had to deal with a primary blood condition accompanied by enlargement of the spleen and liver, and a definite blood picture pathognomic in its nature, which was not leukemia, but which at any time might degenerate into leukemia similar to that found in adults. These cases he called pseudoleukemic anemia infantum, because, whereas, they presented all the characteristics of leukemia, still postmortem examination showed none of the anatomical changes usually found in this condition.

The result has been a confusion of a wide-reaching character, and an encroachment on nomenclatures known for a long time to pertain to conditions found in the adult in which the blood picture is dissimilar to that found in Von Jaksch's cases in infancy. Such is the pseudoleukemia of Birch Hirschfeld.

The next trend of thought, and that which is probably the most accepted one to-day, was to consider this condition a secondary anemia due to disturbance of nutrition, which reacted on the blood-forming organs, such as the spleen and the liver, and which in turn carried with it changes in the blood due to a disturbance of the functions of the blood-forming organs, but not due to a primary disease of either the spleen or the bone marrow, but rather, as intimated by the Italian authors, a disease traceable to disturbed functions of the gut reacting on other or-

gans, and causing severe anemia. In this rubric we would classify the work of Fischl, Epstein, Wentworth.

The third trend of thought is that of the French authors, Weil and Clerc, and the German writer, Lehndorf, who consider this condition a primary anemia allied very closely to true leukemia, which was likely at any time to degenerate into this disease, and which they called myelemia. It may be stated here that no one has yet shown that any case which at the start was an anemia pseudoleukemica of Von Jaksch, or at least which presented the symptom complex, of these cases could degenerate into a true leukemia. A careful study of the whole literature fails to demonstrate such a case. One of Von Jaksch's cases, which clinically seemed to him identical with those described by him as anemia infantum pseudoleukemica, was proven postmortem to be a true leukemia, thus disproving the possibility of these two conditions merging into one another.

An analysis of the published cases of Von Jaksch's disease shows that in the blood pictures the hemoglobin varies from 10 per cent. to 80 per cent. in the various cases at different periods of the disease. The red blood cells vary in number from 1,000,000 to 3,000,000, or even 5,800,000 in various cases, and in 1 case, that of Fowler, the red blood cells varied from 1,000,000 to 5,000,000 to the cm.m. The white blood cells varied in the different cases from 4,800 to 5,800 to 40,000 to the cm.m. As compared to the white blood cells at one time, in the much quoted article of Lehndorf, there was a leukocytosis of 40,000 white blood cells to 1,600,000 of the red. At another time there were 15,600 white blood cells to 1,000,000 of the red.

In Morse's cases the leukocytosis in certain cases was 47,200 white blood cells as compared to 5,800,000 red blood cells. In one case there was really a leukopenia of 4,800 white to 950,000 reds.

As to the presence or absence of nucleated red cells, Von Jaksch does not give any data, inasmuch as at this time no differential counts were made. But in the cases of Lehndorf, Berggrün, Morse, Zelenski, Cybulski, the nucleated reds were present either in small numbers or in predominant proportion. Myelocytes were present in from $1\frac{3}{10}$ per cent. to 17 per cent. of the white blood cells. As to the predominance of the lymphocytes, large or small, in some cases we have a record of the presence of 17 per cent. to 41 per cent. In other cases of 11.5 per cent. to 72.6 per

cent. It can thus be seen that in some of these cases there is really a lymphocytic leukocytosis; and that this, in a superficial examination, might be very well confounded with a lymphocytic leukemia.

In the blood examination of 9 personal cases which I consider as presenting the clinical symptoms of Von Jaksch's disease, the hemoglobin ranged from 28 per cent. to 65 per cent. The red blood cells in some cases fell as low as 1,400,000, and in others as high as 4,448,000. The leukocytes ranged from 5,200 to 7,500 in 1 case; to 40,000 to 80,000 in another. In all cases there were nucleated red blood cells, normoblasts, megaloblasts from a number in each field to 7 per cent. or 15 per cent. of the red cells counted. There were several counts made in each case. In some cases at various times, the white blood cells varied in number from 11,000 to 80,000 in the cubic millimetre, with a red blood count of 2,600,000 to 3,700,000. Unless we have repeated counts in a given case, it is impossible to form a correct idea of the absolute relationship of the white to the red blood cells. Some writers have supposed that in the condition of anemia there should be a predominance of the polynuclear leukocytes. This is not so; whereas, in some cases, the polynuclear leukocytes formed 80 per cent. of the white blood cells, in other cases they fell as low as 14 per cent. to 15 per cent.

A reference to the table accompanying this paper will show that the polynuclear leukocytes varied not only in different cases as to their predominance, but in the same case there would be 45 per cent. of polynuclear leukocytes at one count, and in another, taken a few days apart, there were present in 15 per cent. only. So that given a leukocytosis, the predominance of the polynuclear leukocytes, as compared to the lymphocytes, is of no diagnostic value.

The myelocytes were present in all cases, varying in frequency from $\frac{1}{2}$ per cent. to 7 per cent. In some cases at different times the myelocytes varied from $\frac{1}{2}$ per cent. to $4\frac{1}{2}$ per cent. in different counts. It has been shown elsewhere that the myelocytes, also, are not of specific value as differentiating these cases from other cases of severe anemia, and the variation in the same case, at different times of the percentage of these cells, would tend to confirm this view.

The eosinophiles were present in normal percentages in all the cases.

Mast cells were present in all cases in percentages varying from 1 per cent. to 4 per cent.

A study of the blood pictures in my uncomplicated cases only tends to confirm the belief expressed by others that the blood picture in this disease is not a definite pathological picture of anything but a severe anemia in subjects in whom any disturbances of the functions of the blood-forming organs causes a retrograde to the fetal structure.

A comparison of the above blood pictures with those published by Lehnendorf, Fowler, Monti and Berggrün, Zelenski and Cybulski show a remarkable correspondence, and prove a contention which the author wishes to maintain, that though the blood picture is not specific, the clinical features of these cases are characteristic, inasmuch as so many observers agree as to the physical, clinical signs. The author has attempted to classify the pathological findings of all the published cases of Von Jaksch's disease, and in looking over the postmortem changes found in the various reports made of cases of anemia infantum pseudoleukemica of Von Jaksch we find a striking uniformity in the pathological data and a complete absence of anything suggesting true leukemia. In Von Jaksch's cases the spleen was large and firm; the liver was hard, slightly large; the mesentery lymph nodes were large, pale and firm; the heart was the seat of fatty degeneration. There were no other data given.

In Luzet's case, which, in passing, may be said to have taken the leading rôle with various authors who have written upon Von Jaksch's anemia, the spleen was very large, the capsule was thickened, there were no changes in the reticulum, although the pulp seemed to be increased. The liver showed a return to the embryonal type.

In Baginsky's case the spleen showed chronic hyperplasia.

In a case published by Holt, which Wentworth thinks might be interpreted as a case of Von Jaksch's anemia, but which Holt published as a case of pernicious anemia, the spleen showed chronic hyperplasia and congestion. The heart was fatty and there were patches of chronic pneumonia in the lung.

In Adenoud's case the spleen showed hyperplasia of the follicles, increase of the pulp and congestion of the vessels.

In Glöckner's case the spleen showed an increase in the thickness of its capsule and the reticular connective tissue, the epithelioid cells were increased in the pulp, as were also the eosin-

ophiles. There was little in the spleen to account for the changes found in the blood.

In the case published by Fischl the spleen was enlarged and the seat of chronic hyperplasia, and there were changes in the intestine due to intestinal catarrh.

In Lehnendorf's case, in which the postmortem was quite complete and was carried out under the supervision of Albrecht, the marrow was rich in cells; there were normoblasts, leukocytes with granules and those without granules; there were myelocytes, eosinophiles, and giant cells, also cells containing pigment. The marrow was a richly cellular mixed marrow. The liver cells were normal; there were nucleated red blood cells in the capillaries, and myelocytes. The kidney showed parenchymatous degeneration, the heart was negative, the lungs showed peribronchitic infiltration, the spleen showed increased connective tissue, pulp rich in cells, capillaries dilated, eosinophiles present in moderate numbers, nothing abnormal found. Lehnendorf was inclined, from the appearances, to regard the anatomical diagnosis of myelemia, especially supported by the appearances found in the liver and kidney, although the spleen and lymph nodes were less affected, and there was no siderosis. It will be shown later on how little justified this conclusion was.

In the author's personal cases the postmortem findings correspond, in a most remarkable manner, to what has been described in the cases of Von Jaksch, Luzet, Baginsky, Lehnendorf, Glöckner and Adenoud. For the sake of lucidity the author will include here both the history and postmortem findings of a classical case.

CASE I.—Admitted May 8, 1904. Died June 4, 1904. *Diagnosis*—Rachitis—Von Jaksch's anemia. *Complications*—Bronchopneumonia. *Nationality*—United States. Male, age eleven months.

Family History.—Negative. No specific history.

Previous History.—Normal labor. Breast fed until three months; since then on varied diet, bread and milk, soup, chopped meat, etc. No previous disease.

Present History.—Of seven months' duration. Gradually became anemic, irritable, lost appetite; five months ago noticed a kyphosis in dorso-lumbar region. Child does not attempt to sit up or stand. Stools are normal at times, but often con-

tain curds and are green in color. Coughs occasionally. Sleeps poorly at night. Mother says child was stronger when three months old than he is now. No enlargement of abdomen noticed. For the past two or three months has developed swelling on the neck, which the mother thinks is an abscess.

May 18th.—Fairly well nourished. Very marked rickets. Head large. Frontal and parietal bones large. Anterior fontanel open. Posterior closed. Lambdoid suture is broad. A number of Wormian bones to be felt also at frontoparietal suture. Distinct craniotabes. Epiphyses at wrists; ankles considerably enlarged. Slight bowing of forearm. Deep Harrison's groove. Marked rachitic rosary, especially over lower ribs. Every costochondral junction is markedly enlarged. Marked prominence of vertebral angles, especially on left side. The chest is almost rectangular. Kyphosis in lumbar region, which disappears on extension of spine. Tonsils enlarged. *Skin*—a few round macules around knees. An area of indurated skin, in which there are a few crusts and a small superficial abscess on left side of neck. There is a small healing ulcer on right hip. Fingers show marked signs of rickets. They are markedly convex dorsally and considerably enlarged (more or less fusiform shape).

Glands.—Small ones in axilla, groins, neck. Large submaxillaries. Profuse mucopurulent discharge from nose.

Lungs.—Anteriorly loud, moist râles over both chests. Posteriorly, same signs.

Heart.—Negative.

Liver.—Anteriorly, 4" space. Flat at free border, dullness continuing to half way to umbilicus, where it is palpable. Laterally, 6" space to 8" space, continuing into flank.

Spleen.—7" space, continuing down to anterior sup. spine almost to the umbilicus. Palpable at level of anterior sup. spine and reaches to umbilicus. A notch is palpable in anterior mammary line midway between umbilicus and free border. Liver and spleen together fill up half of the abdomen.

Abdomen.—Distended, made tense by crying.

May 19th.—Blood examination: Red blood cells, 3,560,000; white blood cells, 40,000; hemoglobin, 55 per cent.

Cover glass shows: degenerated red blood cells; nucleated red blood cells; myelocytes.

May 20th.—Differential count—spread taken:—

Large mononuclear.....	57
Small " (lymphocytes)	43
Polynuclear (neutrophiles).....	85
" (eosinophiles).....	2
Myelocytes (neutrophile).....	1
" (eosinophile)	1
Mast cells.....	1

190

Mononuclear and polynuclear red blood cells—red blood cells show marked degeneration.

May 23d.—Examination this morning revealed small patch of bronchopneumonia in upper lobe, right side.

May 25th.—Temperature rose to 103.8° F. last night. Throat negative. Lungs unchanged. Pulse rapid. Still has signs of diffuse bronchitis.

P. M.—Large, bluish-red hemorrhagic raised and firm area in skin of outer side of right thigh, from hip almost half way to knee. Somewhat mottled in appearance. A small area like it on right hip. Border ragged.

May 27th.—Child is worse. Pulse weaker. The signs in the lungs unchanged. Liver and spleen are of same size and consistency as on admission. Large moist râles over both lungs. White blood cells, 70,000.

May 28th.—White blood cells, 96,000; red blood cells, 3,520,000; hemoglobin, 55 per cent.

Polynuclear (neutrophile).....	83 per cent.
Mononuclear	9 " "
Lymphocytes	6 " "
Polynuclear (eosinophile).....	1 " "
Myelocytes (neutrophile).....	1 " "

100 " "

June 3d.—White blood cells, 180,000; red blood cells, 3,456,000; hemoglobin, 65 per cent.

June 4th.—Died suddenly early this morning.

CASE I.—Postmortem examination by courtesy of Dr. Mandlebaum, pathologist to the Mount Sinai Hospital, June 5, 1904.
P. M.

Rigor mortis well marked, body emaciated, no edema, no petechiæ, bones rachitic. Body length, 65 inches.

Muscles are pale.

Thymus.—Extended to third rib.

Lungs.—Consolidation of both lower lobes and middle lobe on right side. Purulent bronchitis. Upper lobes negative. Pleural cavities negative. Bronchial nodes slightly enlarged and acutely inflamed.

Heart.—Pericardial sac negative; no petechiæ. Heart muscle pale. Numerous small petechial hemorrhages on surface, mostly posterior aspect. Valves negative. Foramen ovale open. Aorta negative.

Spleen.—Enlarged, extending to level of umbilicus. Surface smooth. On section very resistant and hard; pulp dark in color and granular. Few malpighian bodies prominent. Numerous petechial hemorrhages scattered throughout pulp. Measurements 11 cm. x 5 x 3. Weight, 150 grams.

Liver.—Slightly fatty, anemic; infiltration acini. Gall bladder and ducts negative. Measurements 16 cm. x 9 x 6. Weight 300 grams.

Adrenals.—Negative.

Kidneys.—Many petechial hemorrhages on surface. Surface capillaries injected. Cortex broad. Markings indistinct. Beginning at pelvis and extending into pyramids is a dark, spleen-like substance. Few petechial hemorrhages in pelvis. Capsule not adherent.

Pancreas.—Negative.

Stomach.—Negative.

Intestines.—Small intestine, mucosa injected. Peyer's patches prominent and swollen.

Mesenteric Nodes.—Enlarged and red in color.

Femur Marrow.—Deep red and soft.

MICROSCOPIC EXAMINATION.

Pancreas.—Negative.

Costal Cartilage.—Rachitis.

Spleen.—Capsule thickened; increase of reticulated connective tissue and diminution of pulp. Diminution in number of malpighian bodies.

Mesenteric Glands.—Marked interstitial lymphoid hyperplasia.

Lungs.—Bronchopneumonia—edema.

Iliac Glands.—Lymphoid hyperplasia.

Ileum.—Lymphoid hyperplasia.

Kidney.—Small areas of lymphoid infiltration in medulla, and in cortical portion, and between long tubes, also malpighian bodies.

Bone Marrow.—Lymphoid cells, giant cells blood and all characteristics of normal marrow of infants.

Thymus.—Lymphoid infiltration.

Liver.—Lymphoid infiltration; fatty degeneration, especially marked at periphery of acini.

Heart.—Normal.

ANATOMICAL DIAGNOSIS:—

(1) Infantile pseudoleukemia (clinical).

(2) Pneumonia.

In this place the author wishes to include a case which at first showed all the characteristic symptoms of Von Jaksch's disease, and at the postmortem showed, in addition to the changes in the spleen and marrow, an acute terminal tuberculosis of the lung, bronchial and mesenteric lymph nodes. In the tonsils of this case there were miliary tubercles and tubercle tissue, to my mind, demonstrating a terminal infection of tuberculosis through the tonsils.

This case is a complicated one of Von Jaksch's anemia, and for that reason has been put apart from the other cases.

CASE II.—Male, eighteen months. Was in the hospital from November 5, 1904, to December 25, 1904. Diagnosis: Acute mastoiditis. Discharged cured. At that time history was as follows:—

Family History.—Father had had several attacks of petit mal; otherwise negative.

Past History.—Normal labor; breast fed until present time. Ear discharge for nine days. Then it ceased and swelling appeared behind the ears. No vomiting. Mastoid operation for acute mastoiditis. Healed.

Readmitted January 17, 1905. Mother noticed increasing size of abdomen when she came to take the child from the hospital. Its clothes did not fit about the waist. Abdomen continued to increase in size, and the mother felt something hard in the left side of the abdomen. For the past two weeks the child has been getting

weaker, and for past few days this has been marked. There have been no hemorrhages from the gums, nose, stomach or bowels. Child has had temperature for past two days. Its cough has also been present for two days. No chills or convulsions. Bowels move every day by cathartics. Has had a poor appetite for past week and cries a great deal.

January 17, 1905. *Physical Examination.*—Fairly well nourished—marked pallor of face and mucous membranes. Face looks weary. Anterior fontanel measures 2.5 x 2 cm. and is depressed. Hair is thin. Evidence of rachitis (prominent frontal and parietal eminences, prominent epiphyses, bowing of tibia, bending of ribs). No petechiæ on conjunctiva. Scleræ are blue.

Pupils are equal; react to light. Healed mastoid scar behind the left ear. No ear discharge. There are petechiæ on buccal mucous membranes. Gums are in good condition, not spongy. Twelve teeth (eight incisors and four molars) are present. Tongue is moist and slightly coated.

Numerous petechiæ of various sizes (point to the head of large pin) are scattered over the *skin*. Some eczema of scalp. Several pustules on left side of neck. Finger tips: no clubbing.

Lymph Nodes.—Submaxillary, the size of a bean; axillary and inguinal, the size of a pea. Epitrochlear nodes small.

Lungs.—Anteriorly—slight dullness in left axilla—a few crepitant râles. Posteriorly, some dullness from a little below the right apex to below the angle. Over this area expiration is prolonged. Breathing at right base is somewhat diminished. There are some subcrepitant râles.

Heart.—At apex, first sound is sharply accentuated. Just within the apex is heard a soft blowing systolic murmur. At the base, a blowing systolic murmur. Second pulmonic sound accentuated.

Pulse.—Rapid, regular, fair force.

Liver.—Sixth rib to umbilicus. Measurements: anterior axillary, 5 cm.; mid clavicular, 11.0 cm.; median, 6 cm.; left parasternal, 7.0 cm. Edge is sharp; surface fairly smooth, firm, but not tender.

Spleen.—11 cm. in mid clavicular line. Edge sharp. Surface smooth. Consistency harder than liver. Hylus easily felt. Not tender.

Abdomen.—Protuberant, due to liver and spleen. Small distended veins present over abdomen.

January 18th.—Differential count white blood cells, 200 cells counted.

White blood cells	20,800
Red blood cells	3,536,000
Hemoglobin	35 %
Polynuclear neutrophile	46.5 "
Large lymphocyte	35.5 "
Small lymphocyte	16.5 "
Mononuclear leucocyte	1.0 "
Basophiles	0.5 "
Eosinophile	—
Myelocyte	—

Total 100%

Moderate number of normoblasts. Some poikilocytosis.

January 23d.—White blood cells	40,000
Red blood cells	2,464,000
Hemoglobin	25 %
Polynuclear neutrophile	62.5 "
Large lymphocytes	14.5 "
Small lymphocytes	10.5 "
Mononuclear leucocyte	0.5 "
Basophile	—
Eosinophile	2.5 "
Myelocyte	9.5 "

Total 100.0%

Characteristics same as on January 18th.

January 29th.—White blood cells	43,600
Red blood cells	2,016,000
Hemoglobin	25 %
Polynuclear neutrophile	47.5 "
Large lymphocytes	27.0 "
Small lymphocytes	10.0 "
Mononuclear leucocytes	0.5 "
Basophiles	—
Eosinophiles	1.0 "
Myelocytes	14.0 "

Total 100.0%

Same characteristics noted as before. Microcytes and macrocytes also observed.

While 200 white blood cells were counted, 103 nucleated red blood cells were observed, viz.:—

Megaloblasts	35
Microblasts	8
Normoblasts	60

January 23d.—Since admission has been running a moderate temperature (101° - 102°) general condition somewhat poor; patient looks more anemic. There is mucopurulent discharge from both ears. For the past few days there has been swelling of upper lip, fissuring of upper lip and slight bleeding. No local heat, but slight tenderness. Less marked swelling of lower lip. Whole face is puffy. There is some dyspnea, slight cyanosis. Slight movement of *alæ nasi*. Tongue is moist and fairly coated. Gums are not spongy. Some petechiæ in mouth. Most of petechiæ on skin are fading.

Lungs.—Some dullness and crepitant râles in lower left axilla. Some crepitant râles in right axilla. Posteriorly, some dullness from apex to angle of scapula of right side, with prolonged expiration and a few subcrepitant râles. Some dullness at both bases: some subcrepitant râles.

Liver.—Ant. Axillary line 5.0 cm. Mid-clavicular line 9.25 cm. Median 6.5 cm. L. Parasternal 7.0 cm.

Spleen.—Mid-clavicular line, 11 cm.

Abdomen.—Movable dullness in flanks. Veins still dilated.

Liver.—Liver is practically unchanged.

Spleen.—Is now 13 cm. below F. B. in mid-clavicular line.

Lymph nodes.—Show no marked change in size.

January 29th.—Child's condition is worse this morning. Face has a swollen, edematous appearance, with a bluish tinge around the *alæ nasi* and lips. A fresh crop of petechiæ over chest, abdomen, hands and lower extremities. There is a hydremic condition of the whole trunk. Lymph nodes of neck axilla and groin are still enlarged.

Spleen.—Now reaches behind the crest of the ileum, 16 cm. below the ensiform cartilage. Skin has distinctly jaundiced hue.

Liver.—Soft, 10 cm. below free border in mammillary line.

Lungs.—Ant. right side—dullness, crepitation, distant breath-

ing in middle region. Left side—Bronchopneumonia still present at the apex. Posteriorly at extreme apices on both sides, signs of consolidation.

CASE II.—POSTMORTEM. BY COURTESY OF DR. MANDLEBAUM,
PATHOLOGIST TO THE MOUNT SINAI HOSPITAL.

Body of male infant, 68 inches long. Skin and mucous membrane pale. Pin-point petechiæ on both forearms and over abdomen. Eyes, negative. Fontanels closed. Moderate emaciation. Superficial glands not palpable. Rigor mortis is absent. No evidence of rachitis.

Head.—Incision over left mastoid with sinus leading into bone. Wound clean. Sinus not occluded.

Tonsils.—Left tonsil small, centre shows caseous degeneration. Right tonsil small and negative. No hypertrophy of lymphoid tissue at base of tongue. No adenoids.

Thymus.—2 x 3 cm. small.

Thyroid.—Small; isthmus slightly developed. Cut sections negative.

Larynx.—Negative. Trachea and bronchi, negative.

Cervical Glands.—Small, reddish brown; no apparent tuberculosis.

Lungs.—Slight amount of clear fluid in both pleural sacs. Lungs not adherent, but fresh adhesions present between lobes of left side. About the centre of external border of left lung there is an area of scar tissue about 3 cm. square. (On section this corresponds to an indurated area, in which are several small caseous foci.) Lungs do not collapse; external surface in general pale, with some areas of atelectasis. Slight emphysema. Numerous petechiæ on pleura. Bronchial nodes are enlarged, varying from size of a small pea to that of a bean. Some of the large nodes show marked caseous degeneration; others show small miliary tubercles. The pulp is swollen, and either anemic, yellowish or pinkish-red. Nodes of left side more involved than those on right side.

Heart.—Slight increase in pericardial fluid (about 3 cm.). Pericardium, negative. Considerable dilation of right auricle, which is filled with postmortem clot. Valves are negative. Foramen and ductus arteriosus are closed. Heart muscles anemic, friable; marked fatty degeneration, especially in papillary muscles. Endocardium is whitened. Aorta, negative. Petechiæ on surface of epicardium.

Spleen.—Enlarged to three times its normal size; bluish red; no perisplenitis. At hilum two accessory spleens of size of pea, and numerous somewhat larger glands, dark red in color. Organ is very firm. On cut section alternating anemic and congested areas. Marked hyperplasia of pulp. Malpighian corpuscles are conspicuous. Vessels negative. Amyloid reaction negative.

Liver.—Somewhat enlarged; very firm, pale. On section very marked fatty degeneration in scattered areas. Central veins are dilated. Some increase in connective tissue. At hilus are two large, yellowish glands, each about size of hazelnut. Amyloid reaction negative. Scattered over entire cut section are yellowish-gray miliary nodules (cellular infiltration?). Gall bladder and ducts, negative.

Kidneys.—Not enlarged; anemic, soft, capsules not adherent. Numerous petechiæ on surface of left kidney and slight dilatation of stellate veins (on cut section markings distinct); marked fatty degeneration. Cortex swollen. Pelvis and ureters negative.

Adrenals.—Negative.

Bladder.—Small; filled with clear urine.

Testicles.—Negative.

Duodenum.—Negative.

Small Intestine.—Anemic. Both solitary and conglomerate follicles markedly swollen. Many are ulcerated, the ulcers having raised walls, necrotic bases, and tubercles in the periphery. Ulceration most marked near the ileocecal valve.

Large Intestine.—Negative.

Mesenteric Nodes.—Very markedly enlarged to size of hazelnut or walnut. Section is pale, and nearly all show numerous tubercles, but no caseation.

Pancreas.—Small, firm, greyish-white.

MICROSCOPIC EXAMINATION.

Lung.—*Pleuritis.*—Tuberculous bronchopneumonia.

Kidneys.—Chronic parenchymatous and slight acute degeneration.

Liver.—Parenchymatous degeneration. Lymphoid infiltration around the blood vessels in centre lobules, also scattered throughout section lymphoid cells.

Spleen.—Capsule thickened; increase of the reticulated connective tissue; diminished parenchyma or pulp.

Pancreas.—Normal.

Tonsils.—Recent miliary tubercles.

Mesenteric Node.—Recent miliary tubercles.

Bronchial Nodes.—Recent miliary tubercles.

Intestine.—Negative.

Bone Marrow.—Normal; nothing of a leukemia nature.

WEIGHTS AND MEASURES.

<i>Heart:</i>	Apex of right ventricle.....	0.33	cm.
	Base " " "	0.33	"
	Apex of left "	$\frac{5}{8}$	"
	Base " " "	$\frac{5}{8}$	"
	* Aorta ring.....	3.75	
	Isthmus	1.5	
	Pulm. art.....	3.25	
<i>Spleen:</i>	12.5 - 19.5 x 9 x 4 cm.		
<i>Kidney:</i>	L.	7 x 4 x 2.25 cm.	
	R.	7 x 3.25 x 2.75 cm.	
<i>Liver:</i>	R.	18 cm. x 13 cm.	
	L.	11.5 x 5.5 cm.	

A study of the postmortem findings of all the cases of Von Jaksch anemia published thus far, including those of the author, only emphasize the views of the Italian writers, and those of Fischl and the American writers quoted, that there is nothing pathognomic in the anatomical changes in the spleen, in the bone marrow, liver and other organs. In the spleen there has been regularly found an enlarged organ with an increase of connective tissue, a diminution of the splenic pulp, with nothing even remotely suggestive of leukemia.

In the liver there has been, in the various cases published, an enlargement due to simple parenchymatous changes, or to the fatty degeneration or simple lymphoid infiltration.

A study of the bone marrow gives at most a mixed red marrow and its constituents. There is nothing suggestive of leukemia, or a very marked disturbance in the structure, which could be designated as specific. A study of the intestine also fails to show anything but lymphoid infiltration.

The clinical picture presented by cases of anemia, described by Von Jaksch, and following him by writers mentioned in this paper, is certainly easy of recognition.

The anemic habitus, the tumored abdomen, the large spleen of enormous size, the increased size of the liver, the intestinal dis-

turbances, easily enable us to recognize such cases apart from the cases of slight anemia, with moderate enlargement of the spleen. There is nothing, however, in these cases which suggests leukemia, except it be the large liver and spleen. The course of some of these cases resulting in complete and satisfactory recovery, certainly impresses me with the fact that the condition is rather one of a severe disturbance of the nutritive functions of certain organs, such as the intestine, and its large secretive glandular system, reacting upon certain organs, such as the spleen, causing changes in the same, with secondary changes in the blood, which may assume a rôle of primary importance.

Von Jaksch's anemia is, therefore, a severe secondary anemia, with or without marked leucocytosis. Those cases which have been reported as terminating in true leukemia were really cases of leukemia from the outset. Cases of true Von Jaksch disease, if they terminate fatally, do so through some intercurrent disease, such as pneumonia or tuberculosis, to which they fall easy victims.

A CASE OF VON JAKSCH ANEMIA IN WHICH IMPROVEMENT IN ALL
CLINICAL SYMPTOMS AND BLOOD PICTURE OCCURRED.

Male, eighteen months.

Family History.—Both parents and five other children are healthy. Mother never had a miscarriage.

Previous History. No history of any acute illness. Labor was normal. Child was breast-fed for twelve months, and since then has been getting milk and soft gruels. Appetite has always been good. Bowels have always been constipated, and child has been getting either enemata or castor oil daily. Father says child never vomited, and does not know whether it ever had green stools. No blood in stools. First tooth at eight months. Could say mama and papa at thirteen months, but for the past few weeks has not been speaking at all. Has always been a weak, pale child, and smaller than the other children. Child never cried much. Father does not know how long the child has been coughing. Four weeks ago he noticed that the baby's abdomen was swollen, and for the last few weeks the child has been losing weight. Child has never been able to sit up alone. Its feet have not been swollen. Ear discharged at seven months. Parents never noticed any tumor in abdomen. No fever, convulsions or epistaxes. No rash.

Physical Examination.—General condition: Fair. Marked evidences of rachitis shown by the open fontanel, rosary and

bosses: no craniotabes. Skin is negative. Many small glands in the neck, axilla and groin. Considerable emaciation. Ears and mastoid negative. Pupils react to light. Conjunctiva pale. Bridge of nose slightly depressed. Two upper and two lower incisors present. Throat negative. Gums pale.

Chest.—Short, intercostal spaces. Vesiculotympanic resonance over both chests, anteriorly. Harsh breathing over both chests, anteriorly. Dullness at both bases, posteriorly; otherwise negative.

Heart.—Borders are normal. Action regular; systolic murmur over pulmonic area; impurity at apex of first sound.

Pulse.—Regular; fair quality.

Liver.—Three fingers below free border; palpable.

Spleen.—Sixth space. 15 cm. below the free border in the mammary line. The anterior border reaches to the mid-line in the region of the umbilicus. The greatest width is 14 cm.

Abdomen.—Tympanic, lax.

Extremities.—No edema. Enlargement of the epiphyses.

August 8th.—White blood cells, 20,400.

August 8th.—Child steadily losing weight. Liver palpable, 2 fingers below ribs. Spleen 11½ cm. below free border. Abdomen: Coils of intestines can be seen through wall.

August 10th.—White blood cells 22,800

Red blood cells 2,810,000

Hemoglobin 35%

August 23d.—Nucleated cells, including leucocytes and erythrocytes, 200 cells counted.

Polynuclear	39	19 ½%
Large lymphocytes	30	15
Small lymphocytes	76	38
Mononuclears	11	5 ½
Eosinophile	1	1 ½%
Basophile	0	0
Normoblasts	23	11 ½
	12	6
	2	1
	3	3

Total number of white cells counted, 157, of which

Polynuclear 25%

Large lymphocytes	20	} 69 total lymphocytes
Small lymphocytes	49	

Eosinophile	6%
Megaloblasts	32
Microblasts	6

It is evident from this that the number of nucleated reds is large, bearing a proportion of about one nucleated red to every four white cells. The nucleated reds form about 25 per cent. of all the nucleated cells. Of the white cells themselves there is a marked decrease in the polynuclears and a marked increase in the lymphocytes, the two as it were changing places; the former falling to about one-fourth the normal number, the latter being about four times the normal number. There is a slight increase in the number of mononuclears. Neutrophile myelocytes were seen forming 3 per cent. of total number of nucleated cells. Of the red cells (nucleated) normoblasts form the bulk, microblasts being fewer. The normoblasts showed in some two distinct nuclei in one cell; also three foil arrangement and quadrefoil. Besides the nucleated reds there are many shadow cells, some megaloblasts, some microcytes, poikilocytosis. Basophilic degeneration, granular degeneration.

September 25th.—General condition better. Spleen unchanged.

Differential count: 300 cells erythroblasts and leucocytes.

Polynuclear	129	43%	
Large lymphocytes	84	28	} 46 $\frac{1}{3}$ %
Small lymphocytes	55	18 $\frac{1}{3}$	
Mononuclears	5	1 $\frac{2}{3}$	
Eosinophiles	2	$\frac{2}{3}$	
Mast cells	4	1 $\frac{1}{3}$ %	
Myelocytes	10	3 $\frac{1}{3}$	
Normoblasts	4	1 $\frac{1}{3}$	
Microblasts	1	$\frac{1}{3}$	
	6	2	

Differential count: white cells, 289—10 myelocytes = 279.

Polynuclears	129	about 47%	
Large lymphocytes	84	" 30	} 50%
Small lymphocytes	55	" 20	
Mononuclears	5	" 2	
Eosinophiles	2	1	
Mast cells	4	1 $\frac{1}{2}$	
Myelocytes	10	—	

Differential count: reds—nucleated.

Megaloblasts	6 about	55%
Microblasts	1	9%

Comparing this differential count with the previous, certain facts are evident:

- (1) Fewer nucleated reds.
- (2) Each red cell appears to possess larger amount of hemoglobin. The anemia is less marked as shown by the fewer number of shadow cells, poikilocytosis, nucleated reds and degeneration.
- (3) The difference between polynuclears and lymphocytes is less marked. The polynuclears show a steady increase toward the normal, the lymphocytes a steady fall toward the normal.
- (4) Fewer myelocytes. At the same time certain changes in the blood remain constant.
 - (1) Relative lymphocytosis.
 - (2) Presence of myelocytes.
 - (3) Evidences of some anemia, nucleated reds, degeneration, etc.

Coincident with these changes in the blood, the following clinical changes have been noticed:

November 14th.—White blood cells	11,000
Red blood cells	3,730,000
Hemoglobin	44%

Examination of Blood Smears.—The red blood cells were in the main of small size, though there were many of normal size and a few macrocytes. There was fairly marked poikilocytosis, slight polychromatophilia and basophilic degeneration. The cells were as a whole fairly well stained throughout; there were many which approached shadow cells, though they were not quite faint enough to be called such. There were no megaloblasts, but five normoblasts in 200 cells; four of these had simple nuclei and one a double nucleus. Three of the nucleated reds showed polychromatophilic degeneration.

200 nucleated cells were counted.

72 polynuclears or.....	36%
60 large lymphocytes.....	30
47 small lymphocytes.....	23 1/2
0 eosinophiles	0
1 Mast cell.....	1/2
10 large mononuclears.....	5

Myelocytes	
3 neutrophilic myelocytes.....	$\frac{1}{2}$
1 eosinophiles	$\frac{1}{2}$
1 basophilic	$\frac{1}{2}$
5 normoblasts	2 $\frac{1}{2}$
<hr/> 200	<hr/> 100

195 white blood cells and 5 nucleated red blood cells. The nucleated reds were all normoblasts.

December 15th.—The blood continues to improve.

41% polynuclear,
46% large lymphocytes,
10% small lymphocytes,
3% large mononuclears,
0% myelocytes.

The red blood cells are becoming more deeply stained; there is less poikilocytosis and very little polychromatophilia. In this examination no nucleated reds were found. There are still a number of macrocytes and microcytes present in the blood.

January 3d.—Red cells numbered 4,672,000.

January 10th.—For the past month there has been a progressive improvement in the child's condition. The color has improved. There has been a gain of about one pound in weight. There has been slight gain in the number of red cells, and no change in the hemoglobin. There is practically no change absolute or relative of white cells (which have been practically normal for the past month). At present patient has all his incisors. The anterior fontanel is practically closed. No abnormal enlargement of the *lymph nodes*.

Spleen is 5.5 cm. below free margin of the ribs (1 cm. less than on August 9th).

Liver is 5.0 cm. below free margin of the ribs.

January 11th.—Red cells number 5,208,000, white cells 13,500. The differential count of the white cells, 200 counted.

Polynuclear neutrophiles.....	56.5	per cent.
Large lymphocytes.....	20.0	" "
Small "	19.5	" "
Basophilic	3.0	" "
Mononuclear leukocytes.....	1.0	" "
<hr/> Total	<hr/> 100.0	<hr/> " "

No nucleated reds; no myelocytes observed. Some slight irregularity in the size.

The case last recorded is one in which the blood changes were carefully studied from time to time over a space of six months. The notes show very well the changes which occur when a case of the form of anemia which we are discussing improves or makes a so-called recovery.

The most marked changes in addition to an increase in body weight and general well being occur in the blood pictures. The total number of red blood cells increases, the cells assume a greater regularity of size, and there are no longer the large number of microcytes and macrocytes seen when the anemia was progressing; the hemoglobin of the whole and undivided cell increases and the shadows are less marked, nucleated red blood cells become less frequent, and finally are difficult to find.

The changes in the white blood cells, also, are remarkable; the inverse relationship in some cases of a predominance of large or small lymphocytes disappears, and the percentage of polynuclear cells takes on a normal ratio, megalocytes and abnormal pictures disappear. The size of the liver and spleen, on the other hand, may not diminish to any marked extent; and this may account for the presence of large spleens in later childhood, which are not accompanied by abnormal blood or other physical changes.

All the above improvement can only result, as seen in my cases, when we have succeeded in improving the general nutrition of the patient by a careful regulation of the intestinal processes, when the movements from foul-smelling and abnormal characters become normal in color and consistency, then the general improvement, both of the physical state and that of the blood, results. So marked is this, that I have in all cases directed my attention to a close study of the diet and the administration of remedies which could improve the processes of intestinal digestion. This would seem to support the view that many of these cases of severe anemia with enlarged liver and spleen have an intestinal origin not to be overlooked.

NOTE.—The clinical and hematological minutiae of the six additional cases belonging to the author's series of *Anemia Infantum Pseudoleukemica* will be found in the transactions of the American Pediatric Society for 1906. Their synopsis is given in the annexed table.

CASES FROM THE LITERATURE.

Author	Percentage Hemoglobin	Red Cells	White Cells	Number of Nucleated Erythrocytes in mm.	Polynuclears			Myelocytes	Large Mononuclears and Transitionals	Large and Small Lymphocytes
					Neutrophile	Eosinophile				
Lehndorf.....	10%-25%	1,040,000-1,610,000	15,600-40,000	500-20,000	40-53.5	0.6-1.3		1.3%-12%	7.5-22.5	17.6-41.4
Monti and Berggrün.....	30%-42%	2,100,000-3,200,000	21,000-41,000	Yes				No differentials except presence of mononuclears and polynuclears		
V. Jaksch.....	1. 15% 2. ? 3. ?	820,000-1,380,000	54,000-114,000	No differentials						
Fowler.....	18%-30%	1,300,000-1,600,000	43,000-36,000	No differentials						
Morse: 22 cases of chronic splenic enlargement and anemia.....	15%-65%	1,140,000-950,000	5,800-4,800	20 to a few	25%-59%	0.2%-7%		.2%-10%		38%-69%
Zelenaki and Cybulski: 7 cases, varied severity.....	16%-50%	5,800,000-2,700,000	47,200-10,000	Few to numerous normo- and megakoblasts	25%-64%	0.5%-9%		0.5%-3%		2%-28% 19%-77%
		4,300,000	34,000	570-3,629	18.3%-74.5%	0.1%-5.6%		1.5%-17.5%	1.5 11.5	11.5 72.6

AUTHOR'S PERSONAL CASES.

History	Hemoglobin	Erythrocytes	Leucocytes	Nucleated Reds	Polynuclear	L. Lymphocytes	S. Lymphocytes	Myelocytes	Eosinophiles	Sp. Gr.
Case I. Female, 18 months. Breast 5 months, sterilized milk after. Rachitis, enlarged glands and tonsils adenoids, petechie, spleen to crest of ilium, liver 4 cm. Below free border. Died.	30% 40%	2,260,000 2,044,000 1,440,000	24,000 37,600	7.4%	30.3% 32% 34%	29% 21½% 40%	31.2% 38% 24%		2% 2½% 2%	1,038 Normoblasts, micro- and macroblasts
Case II. Female, 14 months. Breast 2 months, then sterilized milk. Intestinal disorders, petechie, glands enlarged. Rachitis, spleen 7-10 cm. below free border, liver 6 cm. below f. b.	45%	3,488,000	21,600	15% Megakoblasts, or 6% Normoblasts	48% 53%	18% 21%	21% 16%	4% 7%	1½% 2%	Normoblasts Mast cells, ½% " " 1%

AUTHOR'S PERSONAL CASES.—Continued.

History	Hemo- globin	Erythro- cytes	Leuco- cytes	Nucleated Reds	Poly- nuclear	L. Lympho- cytes	S. Lympho- cytes	Myelo- cytes	Eosino- philes	Mast Cells
Case III. (marked I. in paper) Male, 11 months. Breast 3 months, then varied diet. Intestinal disorders, rachitis marked, tonsils large, enl. lymph nodes, spleen to level umbilicus and ant. sup. spine, liver to midway to umbilicus. Died.	55% 55% 65%	3,560,000 3,520,000 3,456,000	40,000 96,000 18,000	Mono- and polynuclear red blood cells	45% 88% —	30% 9% —	23% 6% —	1% 1% —	2% 1% —	1% — —
Case IV. Male, 20 months. Had hydropneumothorax congenita, enlarged lymph nodes, spleen ant. sup. spine, liver 3 fingers below free border. Improved.	42% 45% 42% 37%	4,448,000 4,720,000 3,720,000 5,000,000	38,300 16,400 16,400 25,000	Many nucleated red cells, mostly normo-, few megakaryoblasts. 1-10% of reds, 29 to a field. 18 to a field, normo-, megakaryoblasts; 26 to a field, mostly microblasts.	64% 38% 33.2% 46%	13% 29% 60% 48%	17.4% 26% — —	0.5% 2.5% 3.4% 4.5%	2.7% 2.5% 2% 0.5%	2% 1.3% 1.4% 1%
Case V. Male, 11 months. Breast fed. Gastroenteric disturbances, adenoids, rachitis, liver 2 fingers below free border, spleen to crest of ilium. Improved.	45.40%	3,760,000	7,000	10 in field, normo- and megakaryoblasts, basophilic reds.	34%	20%	38%	5%	2%	2 seen
Case VI. Male, 18 months. Breast fed. Stomach disturbances, rachitis, spleen a hand's breadth below free border ribs, liver 3 fingers below free border ribs. Improved.	28%	1,592,000 Polychromatophilia	24,600	Many nucleated red cells. Most normo-, some megakaryoblasts.	14% 27%	33% 41%	26% 24%	— —	2.3% 7%	4% 1%
Case VII. Male, 18 months. Breast and mixed diet. Intestinal disturbances, enl. lymph nodes, spleen to ant. sup. spine, liver to 3 fingers below free border, petechie.	45% 45% 38%	2,056,000 1,500,000 2,152,000	7,400 5,200 6,000	Yes Yes	49% 33% 27% 25%	8% 4% 4% 18%	43% 61% 68% 48%	1.6% 10% 3%	2% 1% —	1% — —
Case VIII. Male, 18 months. Breast fed. Rachitis, enlarged lymph nodes, spleen 15 cm. below free border, liver 2 fingers below free border.	34% 30% 36% 44%	Shaw basophilic degeneration 9,810,000 2,600,000 3,200,000 3,730,000	22,800 80,000 14,000 11,000	Normo-, megalo- and microblasts. 12 cells in 200. Same as above.	10% 231% 56%	41% 22%	17% 13%	54% 2%	4% 2%	1% 1%
Case IX. (marked II. in paper). Male, 18 months. Has had mastoid disease just previous to admission. Rachitis, spleen 11 cm. below l. b., liver enlarged to umbilicus. Died of intercurrent tuberculosis.	35% 25% 25%	3,536,000 2,468,000 2,016,000	20,800 40,000 43,600	103 Nucleated reds observed in 200 W. B. C. counted. Megalo-, normo- and microblasts. Some two others divided nuclei.	46.5% 62.5% 47.5%	35.5% 14.5% 27%	16.5% 10.5% 10%	— 9.5% 14%	— 2.5% 1%	— — —

DISCUSSION.

DR. MORSE.—I had an idea when the doctor began his paper that there would be a great deal that I would disagree with, but as he read it I cannot see that we disagree at all. I think there is no doubt that there is a more or less definite symptom complex that has been called by the name of Von Jaksch's anemia; but personally I do not believe it is wise to separate it out and give it a name. I think it should be called a secondary anemia. Every one who has seen many of these cases must, I think, have noticed the variability in the blood, not only between the different cases, but in the same cases from week to week, and from month to month. The confusion in classification has arisen largely because people have not realized the great tendency of the blood in all blood diseases of infancy to revert to the fetal type. The lack of postmortem examinations in this condition is very striking. It certainly must be a common one. I see a number every year, but have had a autopsy on but one case. The spleen in that case showed merely a general hyperplasia both of the pulp and of the connective tissue. Dr. Koplik spoke of my combining mild and severe cases. The title of the paper to which he refers was, I think, "The Relation of Enlargement of the Spleen to Anemia in Infancy," in which I purposely collected a number of cases of different types in order to try to prove that we find all gradations and combinations of anemia and enlargement of the spleen and liver in the different cases, and for that reason we cannot set aside any one class of cases as pathologically different from the others.

I am glad that Dr. Koplik could not see anything in my work which justified Lehdorf in using my cases as an argument in favor of his theory, because I certainly had no idea of agreeing with him in any way. I feel sure that the anemia is secondary rather than primary, and think there is no occasion to place it in a class by itself.

DR. CHURCHILL.—I should like to say a hearty amen to the conclusion Dr. Morse has just made. I believe all anemias are secondary affairs, and that we call those which we cannot explain "primary" because we do not know the underlying cause. I believe all leukemias are secondary affairs, the original cause of which we have not yet discovered. We must remember the instability that characterizes all the processes of early life, the most striking example of which is the instability of the nervous system, as a result of which we get convulsions in infants on the slightest disturbance. Similarly the blood-making organs at this period are easily thrown out of equilibrium and manufacture all sorts of queer blood. I think, in regard to the so-called Von Jaksch's disease, that it is simply an irregular manifestation of some deep underlying disease. It is of interest to remember the very limited

data upon which Von Jaksch published his views on this subject. He reported 3 cases, one of which was a case of severe rickets, one had mild rickets, and the third showed leukemic changes at autopsy. On that basis he gives this name to a separate disease. I believe that all the cases that are published under this name will be found to be due to some vice of nutrition—rickets, tuberculosis, some severe intestinal trouble, or some other deep underlying cause. It seems to me that it merely confuses the literature to try to make it a separate disease.

DR. S. MCC. HAMILL.—I had admitted to my wards in the Polyclinic Hospital in Philadelphia, about a year ago, a colored infant, which was sent in as a case of acute endocarditis. I was very much interested in examining the case to note that the child had an extreme anemia, which did not at the time suggest to me Von Jaksch's disease. On inquiry of the mother I learned that the child had been anemic for a number of months. The infant had a very loud murmur at the apex of the heart, which I took to be functional. The blood picture was that of Von Jaksch's disease, and the case was so diagnosed by the pathologist. Subsequent blood examinations corresponded closely with the first. After about ten days the child developed pneumonia, died after a short time, and the autopsy showed extensive generalized tuberculosis with the most marked tuberculosis of the spleen I have ever seen. The diagnosis of tuberculosis had been made by exclusion prior to death. I was interested at the time to know whether the case had been primarily one of so-called Von Jaksch's disease, or if the extensive involvement of the spleen with the associated tuberculosis might not have produced an anemia which assumed this type. I came to the latter conclusion finally, seeing no reason why the anemia should not have been secondary in this instance to the tuberculous process. I am glad to hear Dr. Koplik take the stand that this disease is a secondary anemia. The cases I have seen in Philadelphia have occurred almost exclusively among the children of the foreign population, principally the Italians and Russian Jews.

DR. ALFRED HAND, JR.—I would like to mention a similar case showing apparently the secondary nature of these cases. This was also a colored child, admitted to my wards at the Children's Hospital. The spleen was the largest I have ever felt in this condition, reaching far into the right iliac fossa. The blood count showed increased leukocytes and reduction in the red cells. The child developed a pneumonia and succumbed. At autopsy, the only tuberculous focus was in the bronchial glands. The pathologist has not reported on all the findings in the different organs, but the spleen showed no evidence of tuberculosis. Before I had seen any of these cases, on reading the literature I had an idea that probably they were secondary, and the more I see

now (we usually have about one a year) the more I am convinced that they are secondary anemias.

DR. J. P. CROZER GRIFFITH.—I want to express my thanks to Dr. Koplik for his valuable paper, but to urge upon him the advisability of changing his title. I feel that if we put under this heading, "Anemia Pseudoleukemica Infantum of Von Jaksch," all the cases he and the other speakers have mentioned, the title is not fairly applicable. As I recollect Von Jaksch's description he insists upon certain definite blood changes. Now there are apparently no uniform blood changes in these cases reported here. We should then either limit the cases which go under this heading or else do away with the heading. I have seen cases year after year which had the symptoms mentioned, but which did not have the peculiar symptoms described by Von Jaksch. Last year I did have a very typical case of what might be called Von Jaksch's disease, but which autopsy showed to be probably the infantile form of leukemia which has been described by writers.

It would be better to divide the cases into (1) infantile leukemia and (2) secondary anemia with enlargement of the spleen.

Stenosis of the Isthmus of the Aorta in an Infant.—

Andry reports (*Lyon Médical*, January 28, 1906) the case of an infant that lived twenty-three hours suffering from intense and paroxysmal dyspnea, accompanied at intervals by a sort of slow wheezing. Pulmonary auscultation was negative. There was a dullness in the left subclavicular region and in the upper part of the axilla, which was continuous with the cardiac dullness. Radiography showed a corresponding dark zone. There was precordial bulging. The heart sounds were dull and distant, with no murmur. Respiration a little obscured, particularly on the left side; no râles. Cyanosis marked, but not comparable with that present in true morbus ceruleus. At the autopsy the heart was found to be double its normal size, with the greater degree of hypertrophy in the right ventricle. The subclavicular dullness was shown to be due to the hypertrophy of the heart and atelectasis of the compromised left lung. There was stenosis of the isthmus of the aorta between the left subclavian and the arterial canal and very marked again at the level of the primitive carotid and the brachiocephalic trunk. Above the stenosis the aorta was diminished in size, but not in a proportionate degree. The pulmonary artery was dilated from its origin. It was slightly contracted at the level of the persistent arterial canal. There were persistent interauricular and interventricular communications.—*New York Medical Journal*.

MODIFIED WET NURSING.*

BY THOMPSON S. WESTCOTT, M.D.,

Associate in Diseases of Children, University of Pennsylvania,
Philadelphia.

During the past fifteen years, coincident with the remarkable advances that have been made in all branches of medical science, the empiric art of artificial infant feeding has been revolutionized by the labors of Rotch and many who have followed in his footsteps, and we can now feel fairly satisfied that its principles have been reduced to something like a scientific basis. The difficult problems of feeding in abnormal cases have been met and solved, and our medical schools are now sending out their graduates to all parts of the world well equipped in the theoretical knowledge of how to fit the food to the varying and often idiosyncratic needs of the infant.

There is danger, however, that in our self-satisfied contemplation of our own skill in the manipulation of feeding mixtures, and our brilliant successes in correcting the errors of our professional brethren, we may lose sight of a feeding specialist whose claims to priority cannot be disputed, and whose method of modification has defied all our efforts to furnish a substitute "just as good."

The family doctor of twenty or thirty years ago, when confronted with the problem of a hungry infant and a failing maternal breast, did not hesitate long in securing a wet nurse and starting his little patient upon a satisfactory modification prepared in the laboratory of her ample bosom.

It is an unfortunate though probably natural sequel of our advance in feeding methods, that the demand for the wet nurse has steadily decreased, and coincident with this the available sources of supply have so diminished that at the present time it is very difficult to secure a suitable woman who is willing to become a foster mother to another woman's infant. I do not know how this may be in other communities; but in Philadelphia and its surrounding territory it has become almost impossible to secure a wet nurse at any price, and we have at length been driven to import them from the more prolific centres of foreign

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 30, 1906.

population, such as New York. One of the largest maternity homes in the city, from which it was once an easy matter to get a wet nurse, has within the past few years adopted the system of retaining available mothers to foster-nurse their foundlings; and even in the other institutions where unmarried mothers are cared for, the utilization of their nursing abilities as a means of livelihood does not offer the attractions that it once did. Add to this the growing independence of the respectable class of mothers, who once could be induced to assume positions as foster mother in private families, and we have an explanation of the decadence of this one-time lucrative source of employment.

As a matter of fact, the passing of the wet nurse, as we have known her often to our sorrow, would not be a source of poignant regret if we were able to secure one when her help was most necessary.

We have all met, and are still meeting, cases of malnutrition in infants, in which the peculiar adaptability of human milk at once suggests it as the quickest and most certain means of restoring a starving baby to health. In many instances the natural repugnance of the mother is an insurmountable obstacle; and the domestic difficulties attendant upon the introduction of a stranger into the household are too well known among the laity to warrant the physician's insistence, especially when he is forced to admit that in all probability he can finally accomplish satisfactory results by modern methods. A certain class of cases, however, is occasionally encountered in which nature has been so outraged by unskillful methods of artificial feeding that natural wet nursing or a modification of it seems to be the only resort if the infant's life is to be preserved. It is to this class of cases that I wish to direct attention and to elaborate somewhat the method of what may be properly termed modified wet nursing. I do not present this with any claim of originality, for I have no doubt that many members of this Society have been occasionally driven by circumstances to adopt some such expedient; but as I am unable to find any definite mention of it in the literature, it will serve as a stimulus to discussion.

By the term modified wet nursing I would indicate a method of feeding in which human milk is to be used in conjunction with artificial food, not in the form of two or three full nursings separated by other feedings of artificial food, as in gradual weaning, but as an integral and very important part of a bottle mixture

containing a cow's milk modification or other food ingredient. The necessity for some such method of administration may lie either (1) in the profound prostration and physical weakness of the baby, rendering active efforts at nursing impossible; or (2) in the absolute refusal of the infant to take the nipple, as so frequently happens when the child has already been weaned, and has become accustomed to the less laborious nursing from the bottle; or (3) when a wet nurse cannot be procured, but some nursing woman can be found, who, while residing at her own home, is willing to supply by pumping a portion of her daily yield of milk. I need not dilate here upon the vital qualities of human milk. Even a few ounces of it administered to an artificially fed infant recovering from an exhaustive illness, such as a severe enterocolitis, acts as a strong vital tonic and stimulant, bringing color to the cheek, brightness to the eye, and restful, satisfied slumber, such as no artificial food that could be tolerated at the time could possibly produce. I have repeatedly made use of temporary wet nursing as a most helpful aid in the convalescence from summer diarrheas in very young infants.

Unfortunately, as I have indicated, an available nurse often cannot be found, and thus in a number of cases I have been compelled to beg or buy a few ounces at a time from some friend of the mother's, or some respectable woman, who, while unwilling to entirely deprive her own infant of its rightful nourishment, could spare a portion of her supply to tide us over a critical period. More than once I have been able to secure small quantities of milk from two women at the same time, and in one case, the history of which I shall presently sketch, for three or four days I had three women contributing their mite of milk to make up our daily supply.

When human milk is to be used in this way it should be collected and transported with all the care that is given to the collection of milk from a dairy herd of cows. As a matter of fact, the danger of contamination of human milk thus treated is decidedly less than in the case of the dairy product. There is no exposure to stable dust and filth, no dirty udder or uncleanly milker to be reckoned with; and if the milk is drawn from a cleansed nipple, with a sterilized pump, poured at once into a sterile bottle and kept upon ice until used, it should be nearly as free from adventitious bacterial contamination as the milk sucked directly from the breast by the nursing infant.

When a wet nurse can reside in the infant's home and can devote herself entirely to its needs, she should be properly instructed in the method of collecting her milk and encouraged to use the pump at regular intervals depending upon the abundance of her supply. If she has a superabundance, her own infant may be allowed to be with her, provided she is able to furnish by pumping an adequate amount for the foster child. As we cannot expect, even under the best conditions, to obtain by pumping as large an amount as the breast would yield to natural nursing, and never except in the earlier days as much as the foster child would need for its complete nourishment, the nurse, as a rule, may be permitted to feed her own baby, or partially nurse it with extra bottle feeding, for the purpose of keeping up the natural stimulation that direct nursing exerts upon the activity of secretion. As long as the nurse can remain under the care and observation of the physician, this is by far the better plan. But when such an arrangement is impossible, the milk from a mother in her own home may be accepted as the next best substitute.

In this plan of feeding the human milk serves simply as one ingredient of the bottle mixture. The average yield for the day should be apportioned in fairly equal amounts for each feeding, and the total quantity of the bottle made up according to the needs of the individual case.

The object of this plan of feeding is, first, to secure a food which can be best appropriated at once by the starving organism of the infant, and then to continue this until, by gradual increase, the artificial ingredients of the bottle can be fitted to the increasing demands of the infant, so that the human milk can be dispensed with altogether and the thriving infant allowed to proceed upon a satisfactory artificial food.

The urgent need and satisfactory employment of modified wet nursing can best be illustrated by the brief history of a case which came under my care last summer. On May 27, 1905, I was called to see Ruth K., born March 24th. Her weight at birth had been 5 pounds, and she had been nursed for only a few weeks. She had then been fed artificially upon the usual variety of foods with indifferent success, her weight at the time I first saw her being about 7 pounds, which was a half pound less than at the previous weighing a week before. She was markedly emaciated, rachitic, and suffering from constant abdominal pain from proteid indigestion, with frequent vomiting. At the time of my

first visit she had been taking for a few days at the suggestion of a previous consultant a bottle of $3\frac{1}{4}$ ounces every four hours, consisting of cream, unknown strength, $\frac{1}{4}$ ounce, whey $1\frac{1}{2}$ ounces, and barley-water $1\frac{1}{2}$ ounces, with a half teaspoonful of sugar of milk (giving percentages approximating 1.9 per cent. fat, 0.20 per cent. casein, 0.53 per cent. lactalbumin, and about 6 per cent. sugar).

As this mixture was evidently unsuitable and the child was in constant pain and vomiting frequently, temporary feeding with egg-water and panopeptone was begun. As the weather was hot and the family anxious to get away to the seashore, the advantages of wet nursing were explained to them, but were rejected by the parents, who were averse to it. Under these discouraging circumstances artificial feeding was begun tentatively with a weak condensed milk dilution, $\frac{1}{2}$ ounce of a 1 in 16 solution, with $1\frac{1}{2}$ ounces of albumin-water and 20 drops of panopeptone, the proportions of the condensed mixture being increased as rapidly as possible and the egg-water diminished until 1 ounce of each was used. The baby became comfortable under this plan of feeding, and the prospects were more promising. An effort was now made to add whey to the mixture, at first in 2 drachm additions. This expedient, however, was unsuccessful. Indigestion began again, and severe colic added to the difficulties despite the use of artificial digestants and carminatives. The only food that could be tolerated with comfort was apparently the condensed milk, and upon this alone the infant was visibly losing ground, and its power of assimilation seemed to be totally in abeyance. On the 11th of June an effort was made to introduce small proportions of a peptonized solution of cow's milk (1 in 4) to replace the egg-water. The movements at this time were fairly good and showed satisfactory digestion. On the 13th a little human milk was secured from a friend of the mother's and was added in small portions to the bottles, while the proportions of the cow's milk mixture were cautiously increased. On the 14th the baby had a sinking spell, due to gaseous distention, and the parents, now thoroughly frightened, consented to have a wet nurse. In the meantime the mother's friend continued to send a few ounces of milk a day, and an old patient of mine was good enough to supply a few ounces more. After running out many promising but futile clues, the father secured a wet nurse on the 15th, and we started with a mixture of $1\frac{3}{4}$ ounces of human milk supplied by the com-

bined yield of the three women, with an ounce of egg-water and three teaspoonfuls of lime-water, given every hour and a half. The baby's condition was now desperate; the temperature was sub-normal, the pulse from 62 to 70, and the respiration shallow and labored. Under the influence of the increased supply of human milk, which was given of necessity from the bottle, with added egg-water, on account of the baby's inability to nurse, a gradual improvement began, and at times a full feeding of mother's milk could be given. In a few days the child was put to the breast, but absolutely refused to draw upon the nipple—a refusal that was final throughout the whole subsequent course of the case.

Signs of dissatisfaction and homesickness on the part of the nurse now seemed to be about to wreck all our plans, but after much trouble a girl mother sixteen years old was procured from one of the New York maternity hospitals, and furnished an abundant supply. The baby was sent to Atlantic City on June 22d, with good prospects of recovery.

As the infant still refused to take the breast, pumping was of necessity continued, the new nurse being able to furnish about 3 ounces four or five times a day. She continued to furnish enough to give $1\frac{1}{2}$ to 2 ounces for each feeding until her services were dispensed with early in August, a period of fully two months, during which the pump was used constantly and without the stimulation of direct nursing.

With the $1\frac{1}{2}$ or 2 ounces of human milk, at first egg-water sufficient to make up the bottle to the required quantity was used, and later this was gradually withdrawn, its place being taken by increasing proportions of a peptonized cow's milk mixture, at first in dilution of 1 in 4, then 1 in 3, and, finally, 1 in 2. By the time the nurse left the baby was taking a satisfactory milk and cream modification of generous strength, and returned home in the fall in excellent condition.

The history of this case illustrates very conclusively the value of modified wet nursing as an extraordinary expedient. It was the first case in private work in which I have ever felt the imperative need of human milk as a life-saving food. The plan of feeding adopted from the beginning of the case until human milk was added is perhaps open to criticism. Condensed milk, the value of which in emergency must be recognized, may not have been the best artificial food that could have been used under the circumstances. It was certainly tolerated with greater comfort than

anything that the child had previously taken, but did not supply sufficient nourishment in the necessarily weak dilutions used to stop the failure of nutrition for a time until stronger proportions could be used. The inability to tolerate whey, as shown by the results before I saw the case, and later when only 3 drams were added to the bottle, prevented the use of one of our most valuable forms of fresh-milk food, and justified my first opinion as to the desirability of human milk as the food of choice under the conditions.

DISCUSSION.

DR. COTTON.—We will all heartily agree with the intent of the paper. The graphic description of the immediately revivifying effects of a few drops of mother's milk on the famishing infant appeals to the experience of every baby feeder. It seems to me that this society can well dispense for a whole year with its mathematics, with its confusing array of figures, the most discouraging thing to the practitioner, and get right down to something he can understand, namely, the advantages of breast milk over every other kind of food for very young infants. Some one may say that is a work of supererogation; but have we ever started out definitely to put into some practical form our convictions on this subject? I believe that all here will agree with me that there is an abundance of mother's milk going to waste all over the country. I believe my experience has been that of others, that a postal card comes, or the telephone rings, and there is the query, "Can you use a wet nurse?" "Do you know of any doctor who can use a wet nurse?" And, then a week later, I want a wet nurse beyond all things and cannot get one. If in every large community the local pediatric society, with encouragement from this well-known body, would take up this matter and organize bureaus of registration for wet nurses, such as we now have for ordinary nurses, under a committee appointed by the local society, every doctor may, if he has a case, get a wet nurse examined and certified by a competent committee. There could be a list of those waiting; one girl could attend to the registration and telephone calls. In this way every physician could secure a competent wet nurse certified to by men in whom he had confidence. We ourselves are partly to blame for the condition of affairs. Some one has remarked that trying to secure a wet nurse was the "white man's burden." The mother's objection and prejudice, too, ought to be overcome. In a recent case, after much trouble to get a nurse, I succeeded, and the mother when she saw the nurse said: "I didn't think you would do such a thing, Doctor; why, you have sent us a black woman." I asked her what kind of a cow she would prefer—a black, a white or a red one?

TYPHOID INFECTION CONVEYED BY A CONVALESCENT INFANT.*

BY THOMAS S. SOUTHWORTH, M.D.,
New York.

As the outcome of the general awakening the world over to the unnecessarily large mortality from typhoid fever, searching investigations have been made into the common and uncommon sources of typhoid infection. Water, milk and shellfish have been repeatedly proven to be carriers of the infection. Epidemics have been traced to improper disposal and disinfection of the excreta of patients during the active period of the disease. At present, the laity as well as the medical profession are fairly well informed of the dangers which exist and the preventive measures to be employed during the continuance of the febrile movement.

More recently, however, the finger of suspicion has pointed to the convalescent, and urgent warnings have been issued by several investigators that the convalescent may still harbor the bacilli in sufficient numbers to constitute a serious menace to the public health. Thus far, only occasional proof has been forthcoming of actual transference of the disease by such convalescents. The difficulties attendant upon the establishment of such proof are considerable, since it is necessary to eliminate beyond reasonable doubt other possible sources of infection. The exceptional circumstances in the following account of two house epidemics of typhoid fever, between which a convalescent infant seems to have been the connecting link, will therefore, I trust, prove to be worthy of record.

The two families concerned in this history will be known for differentiation as the M—— family and the C—— family. The M—— family lived in Blissville, Long Island City, a suburb of Brooklyn; the C—— family in New York City. Their homes, therefore, were in different cities, separated by a wide river, and having different sources of water supply. Typhoid fever had been somewhat prevalent in Blissville when, in October, 1905, the first child in the M—— family was taken sick with that disease. On

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, June 1, 1906.

November 22, 1905, another child, an infant, Teddy M., aged fourteen months, became ill with fever, vomiting and intestinal symptoms, during the course of which he developed a pneumonia. His physician states that his temperature most of the time was about 100°F., but rose, for a few days only, to 102°F. Typhoid was suspected, but several Widal tests gave negative results. He had recovered from his illness before January 8, 1906, when his mother and two sisters, having developed typhoid, he was sent with them to St. John's Hospital, Long Island City, where his mother subsequently died. Still another boy was sent to friends in Elizabeth, N. J., where he is said to have been sick later in the hospital with typhoid-pneumonia.

Teddy M., the infant with whom we are especially concerned, remained in St. John's Hospital four days, during which time the house physician states that he had no fever. He was then, on January 11, 1906, taken to the home of the C—— family in New York. This family consisted of father, mother and four children. They occupied three connecting rooms, the middle one of which was kitchen, dining-room and living-room combined. In this room Teddy M. spent his days. He was pale and sickly, and it is said that his stools were thin, loose and smelled "fiercely." His diapers were usually disposed of quickly in the daytime, but were occasionally left about at night. January 27th, sixteen days after his arrival in the C—— family, I was asked to see him and found a strikingly pale child, now sixteen months of age, evidently rachitic, with large, square head and well developed rosary. Four days previously a somewhat redundant prepuce had become red and irritated, and on this day it was edematous and the tip raw and bleeding. Temperature 103.5° F. There was some cough. and physical examination showed generalized râles, but no evident consolidation. Two days later, under treatment, the temperature was normal, crackling râles right chest posteriorly, edema of prepuce gone and lesions healing rapidly.

February 1st, twenty days after he entered the C—— family, two children of this family, eight and thirteen years of age, began simultaneously to have headache, general malaise and fever; temperatures rose in a few days to 103.5° F., spleens became palpable, tongues heavily coated, and roseola appeared upon the abdomen of one of them. On the tenth day of the disease, Widal was positive in both cases, and they were sent to Roosevelt Hospital.

February 14th, a third child of the C—— family developed temperature with similar symptoms in all respects, and despite a negative Widal on the sixth day was sent to Roosevelt Hospital, where the diagnosis of typhoid was subsequently confirmed. On the day that this third child went to the hospital, the C—— family, now thoroughly alarmed, sent Teddy M. back to St. John's Hospital.

February 22d, through the courtesy of the House Physician at St. John's Hospital, a specimen of Teddy M.'s blood was obtained and submitted to the Board of Health, who reported a positive Widal reaction, thus proving him to have had typhoid fever at some time in the past.

We have, then, in these histories two house epidemics of typhoid fever in different cities, the connecting link between which was apparently an infant of sixteen months of age, who, preceded and followed by definite cases of typhoid in his own family, passed through an illness with prolonged but relatively moderate temperature, with gastrointestinal symptoms and a complicating pneumonia, without positive Widal at the time, but after some weeks giving a positive reaction. This infant, after a period of normal temperature for about two weeks, during part of which he was under observation in a hospital, then entered another family and house in which there had been no typhoid, and during his stay there had only one acute indisposition of a few days' duration, with temperature falling to the normal in two days under local treatment of an edematous and excoriated prepuce. Three weeks after his arrival there, two children came down with typhoid and two weeks later a third child. Painsstaking inquiry revealed no other source of infection. The evidence certainly seems to point strongly to the infant Teddy M. as the carrier of infection after his convalescence.

The rooms of the second family have been described. The infant in question being unable to walk, usually sat in a high chair in the combination kitchen, dining-room and living-room. Every possible opportunity was presented for contamination of food. The loose stools required frequent changing of the diapers by a busy woman, who had five children to cook and care for. The single faucet of cold water over a sink usually filled with soiled dishes and utensils offered the most available facility for perfunctory hand-washing. Observation of this class of people with

large families leads to the conclusion that hand-washing after the changing of diapers is performed only in case the hands are visibly soiled. Hands moist with the urine of a wet diaper are wiped upon the dry one with which the former is to be replaced. This unappetizing picture of domestic life among the artisan class requires no apology for its presentation, since it emphasizes the ample opportunities for the infection of the other children—an infection which seems to have been simultaneous in two of the cases.

In view of the different ways of possible typhoid conveyance in this case, a short summary of recent literature may be admissible at this point. The isolation of typhoid bacilli from the stools even at the present day offers such difficulties as to have limited investigations in this field. Dr. W. H. Park states that the typhoid bacilli are usually eliminated by the feces, being derived from ulcerated portions of the intestines. Their growth within the intestinal contents is, with few exceptions, not extensive. Although usually dying out quickly in the stools, which adds to the difficulty of isolation, in certain stools they multiply freely, finding a suitable soil. V. Drigalski and H. Conradi, who devised one of the quicker methods of differentiating the typhoid from colon bacilli, found typhoid bacilli as a diagnostic aid in the stools of one-half the cases where a 1 to 10 Widal test was still negative. Hiss, while finding typhoid bacilli in the stools in 80 per cent. of the cases examined during the febrile stage, stated that the convalescent cases which he examined gave uniformly negative results, and this rapid disappearance after convalescence was apparently confirmed by others. This, however, is by no means the invariable rule.

Since the establishment of the Royal Institutions for Bacteriological Research, which have taken up the study and control of typhoid in certain districts of Germany, evidence is rapidly appearing of the spread of typhoid by persons long convalescent, who are now technically spoken of as "bacillus carriers." These are defined as those whose excreta contain the bacilli after ten weeks from the beginning of the illness, or from the beginning of the last relapse. Lentz at Trier discovered twenty-two typhoid carriers, to seven of whom other cases, often multiple, were traced. A. Besserer and J. Jaffe found typhoid bacilli in the stools of four persons who had tivhad typhoid three months, six months, four years and seven years

previously. Seige also, who states that "contact infection" from these cases is coming more and more into prominence, reports two especially interesting cases, in which mothers having had typhoid and living thereafter under circumstances which apparently precluded reinfection, infected their children two years and ten years later, the bacilli being isolated from the mothers' stools four years and ten years respectively after recovery from the disease. Furthermore, V. Drigalski and Conradi have demonstrated the bacilli in the stools of four persons who remained entirely well after exposure to typhoid. Such reports, which could be multiplied, suffice to encourage the belief that continued search and newer methods yet to be devised may show that the bacilli persist in the stools even less exceptionally than is now believed, their persistence being due either to chronic infection of the gall bladder or to intestinal conditions which produce stools offering a favorable medium for their growth.

With the urine it is different. The infectious character of many urines during convalescence from typhoid is well established. Many investigators have worked in this field. Thus far it would appear that typhoid bacilli may be found in the urine of about 21 per cent. of the cases (Richardson). They are usually associated with albumin and renal casts, although these may both be present in the urine without the bacilli. Both Richardson and J. Jacobi have found typhoid bacilli in the urine as early as the eighth day of the disease, although they usually appear in the later weeks. Petruschky found them for the first time in 1 case six days after complete defervescence. All agree that if they appear at all they persist in the majority of cases into convalescence. Richardson's conservative statement is that they may persist for weeks, occasionally for months, rarely for years. Dönitz reports the finding of bacilli in the urine of two women four and seven months after their illnesses; the latter of whom infected her husband. When present the bacilli are usually in pure culture and enormous numbers. Petruschky, previously quoted, estimated them in one case to be 172,000,000 in 1 c.c. It is stated that such urines are often pale, abundant, somewhat cloudy and with a tendency to form a film on the surface upon standing. These conditions should at least excite suspicion.

The feces and urine of convalescent typhoid patients are, however, not the only sources of danger. The persistence of bacilli

in pus as long as one year is perhaps of lesser importance; but it is worthy of note in connection with the history of the case which I have reported, that the bacilli are present and may persist for considerable lengths of time in the sputum of patients having a complicating bronchitis or pneumonia. Seven weeks is the longest period recorded.

While it has thus been established that typhoid bacilli may persist in the stools, urine, and possibly the sputum of patients convalescent from typhoid for considerable periods, a general recognition of this fact has not as yet entered sufficiently into prophylactic practice. The convalescent typhoid patient, except from certain hospitals or from the care of the more enlightened practitioner, is allowed to go his way without any special precautions. Disinfection of stools or urine ceases with the departure of the trained nurse or the discharge of the patient from active treatment. Fortunately, the adult and the older child when convalescent pass their urine and stools in the closet, so that the danger of infection through manual contamination is largely eliminated, the patient himself being presumably immune to reinfection. With the infant it is different, since the diaper or vessel is handled and the infant cleansed by some attendant. In the absence of any appreciation of the dangers, this may readily afford opportunities for the infection of the attendant or of others whose food she may prepare.

Such a case as that which I have related and the exceptional circumstances which made it possible to fix upon the infant as the link between the two outbreaks may aid in throwing additional light upon the origin of some of the apparently sporadic cases. It also again directs attention to the mild course which the disease may run, particularly in young children, and the possibility that it may escape recognition, especially if the appearance of the Widal reaction be delayed or the attention be diverted by complications. Unfortunately, we can only conjecture whether the infection was conveyed through the more probable agency of a bacteria-laden urine, or whether the chronic intestinal disturbance of a noticeably rachitic infant with foul stools produced a favorable soil for the persistence of the bacillus either in numbers or virulence.

Thus far, no effective method of eliminating the typhoid bacilli from the intestinal tract seems to have been discovered. The use of urotropin for sterilization of the urine where typhoid

bacilli are demonstrable has been given a fairly wide trial, and despite an occasional temporary hematuria, which ceases promptly upon discontinuing the drug, the testimony is, in the main, in its favor.

DISCUSSION.

DR. EDSALL.—I have been much interested in the question of contact-infection in typhoid fever, particularly because I am convinced that a large proportion of physicians do not give those caring for typhoid cases sufficient warning of the danger of contact-infection. In a large number of hospital cases in which I have made as careful inquiries as were possible without directing suspicion against the family doctor, I have been unable to find that in most instances doctors give their patients any comprehensive or detailed instructions, even during the course of the disease, that bear upon contact-infection. Last year I had Dr. Despardy go over about 250 of my typhoid cases in the Episcopal Hospital, giving careful attention to the circumstances in which these cases developed, for the purpose of determining in how many instances contact-infection appeared reasonably probable. It was, of course, impossible to reach a definite conclusion in these cases, because there was at the same time evident opportunity for water-infection; however, by as careful exclusion as could be exercised, he found that in about 17 per cent. of the cases there was a lively possibility of contact-infection, and there were over 25 per cent. in which the history was very suggestive.

The point of particular interest in connection with this is that a very large proportion of these occurred in children of families in which there were cases of typhoid fever; and, as is well known, children are especially subject to contact-infection of this and of other sorts, because of frequent close association with the sick, their lack of understanding of the danger, and other factors, such as frequently putting things into their mouths, etc. I grow more and more convinced of the importance of contact-infection in typhoid fever, and I think that it is likely to be of even more importance in children than in adults.

BIBLIOGRAPHY.

- W. H. Park. "Bacteria and Protozoa." 2d edition. 1905.
 v. Drigalski u. H. Conradi. "Ueber ein verfahren zum nachweis der typhus bacillen." Zeitschrift f. Hyg. u. Infections krankheiten, 1902, Bd. XXXIX., s. 283.

- Hiss. "Studies in the Bacteriology of Typhoid Fever with Special Reference to its Pathology, Diagnosis and Hygiene." *Medical News*, May 11, 1901.
- Lentz. "Ueber chronische typhusbazillenträger." *Klin. Jahrb.*, 1905, XIV., s. 475.
- A. Besserer u. J. Jaffe. "Ueber typhus kulturen, die sich den immunitätsreaction gegenüber atypisch verhalten." *Deut. Med. Woch.*, 1905, s. 2,044.
- Seige. "Ueber contagion infection als aetiology des typhus." *Klin. Jahrb.*, 1905, Bd. XIV., s. 507.
- M. W. Richardson. "On the Presence of the Typhoid Bacillus in the Urine." *Journal Experimental Medicine*, May, 1898.
- M. W. Richardson. "Upon the Presence of the Typhoid Bacillus in the Urine and Sputum." *Boston Medical and Surgical Journal*, Feb. 5, 1903.
- Jos. Jacobi. "Ueber das erscheinen von typhus bacillen im urin." *Deut. Arch. f. Klin. Med.*, 1902, Bd. LXXII., s. 442.
- J. Petruschky. "Ueber massenausscheidung von typhus bacillen durch den urin von typhus reconvalescenten und die epidemiologische bedeutung dieser thatsache." *Centrbl. f. Bakt. u. Parasit.*, 1898, No. 14, s. 577.
- W. Dönitz. "Ueber die quellen der anstechung mit typhus, nach Berliner beobachtungen." *Festschrift zum 60te geburtstage Robert Koch*. Jena, 1903, s. 297.
- C. D. Easton. "A Further Contribution to the Study of Bacilluria in Typhoid Fever, and its Treatment with Urotropin." *Boston Medical and Surgical Journal*, Aug. 17, 1905.

Importance of Inorganic Salts in Metabolism.—Dogs were fed by Hirschler and Terray (*Zeitschrift für Klin. Med.*, Vol. LVII., No. 2) on a determined diet and the elimination of the waste carefully studied. The results indicate that it makes a great difference in what form the inorganic salts are ingested in respect to their assimilation. When phosphorus is given in the form of yolk of egg, the nitrogenous elements of the body make more rapid growth than when it is given in any other form. The yolk probably owes this property to its lecithin. This exhaustive research, therefore, scientifically confirms the general opinion in regard to the nourishing properties of yolks of eggs, and their early adaptability for the diet of children. A case of chronic deforming endocarditis was also studied from the point of view of the metabolism on various diets. The extensive work was done under a grant for scientific research, and presents a résumé of previous work in this line by various authors.—*Journal of the American Medical Association*.

HYPERTROPHIC STENOSIS OF THE PYLORUS IN AN INFANT EIGHT WEEKS OLD—OPERATION— RECOVERY.

BY R. B. KIMBALL, M.D.,

New York,

AND

FRANK HARTLEY, M.D.,

New York.

This subject has occupied a very prominent place in pediatric literature since the first successful operation eight years ago. Fisk, of New York, has recently collected 71 operative cases, with recovery in 53 per cent.; but of these an overwhelming majority is reported by European observers. In this country comparatively few cases are on record, and so far as we have been able to learn only 3 operative cases have recovered. The following history is noteworthy because the child recovered entirely, and now, at nine months of age, is in very good physical condition and its digestive function apparently re-established. An interesting feature of the case was the difficulty in arriving at a diagnosis, which, although suspected from the beginning, could not be established until after several weeks of observation. This was obscured by the absence or infrequency of several of the characteristic symptoms; for example, the constipation, which generally obtains in these cases, was not only absent, but, on the contrary, the stools were more frequent than usual; there was also very little emaciation. During the whole period of the child's illness the loss of weight was inconsiderable; lastly, the peristaltic waves, which may be considered the classical symptom, were observed only once.

Erma F., born March 12, 1906, after a normal labor, the first child of young and healthy parents; birth weight 7 pounds, 8 ounces. Child was nursed entirely by the mother; initial loss of weight only 6 ounces; at the end of ten days had recovered its birth weight.

From the first the child regurgitated its food too frequently after almost every nursing; this usually occurred immediately after. Up to the tenth day the stools were normal. At this time

profuse vomiting began for the first time and continued to recur two or three times a day; the vomiting was usually projectile; entire contents of the stomach were rejected. On account of this, the interval between the nursings was now increased from two to two and one-half hours. This was followed by a slight improvement, but for a day only.

At three weeks of age, in spite of these difficulties, the child weighed 8 pounds, 8 ounces, a gain of 1 pound since birth; but as the vomiting persisted, the nursing intervals were now increased to three hours, under the advice of Dr. A. W. Bingham, who was then in charge of the case. Conditions remained about the same until the child was a month old. Still vomiting about three times a day at intervals of one-half hour to one and one-half hours after feeding; stools were always yellow and usually thin, sometimes containing sour curds, and varying in number from two to eight a day.

April 15th.—Patient came for the first time under my observation; it was nearly five weeks old, weighed 8 pounds, 3 ounces—loss of 5 ounces in two weeks. Its general condition was very good; abdomen soft, no tumor palpable; heart, liver and spleen normal; peristaltic waves have not been noticed; stools orange in color but fluid, leaving yellow stain on the napkin. Nursing interval increased to four hours, and this as usual was followed by a slight improvement for a day.

April 20th.—Since the last change vomiting has occurred as usual, about three times in twenty-four hours. Child was allowed to nurse only five minutes; weighed before and after nursing; gained from 2 to 3 ounces at a time. Under these changed conditions vomiting was rather less.

Examination of the mother's milk at this time showed the following:—

Fat	3.40
Sugar	6.50
Proteids	2.55

As the proteids seemed too high, mother's diet was restricted, and she was advised to take walks in the open air.

Nursing interval was still four hours, but the child was allowed to nurse only two minutes. In spite of this, however, conditions were unchanged. At this time a nipple shield was resorted to. One was selected with a very small opening in order

to make the act of nursing as slow and difficult as possible, on the hypothesis that the child was getting its food too rapidly. With the shield, child was allowed to nurse fifteen minutes every three hours, and during this time by dint of hard work it got about three ounces. For four days after this there was no vomiting at all, for the first time since its birth. The problem was thought to be solved, but as the baby under this régime fretted for such a long time before nursing, and seemed so hungry, it was thought best to return to two and one-half hour intervals. Immediately the vomiting began as before. The child fretted before feeding, from hunger, and cried violently for nearly one hour after feeding, from pain.

Stomach washing, which was practiced nearly every day, two hours after feeding, seemed to relieve the condition temporarily. Stomach always contained from 2 to 4 ounces of undigested food, and evidently did not empty itself at all. Usually considerable gas in stomach. Stools still of good color, very thin, three or four a day.

April 24th.—Child six weeks old; there has been no improvement at all in the gastric symptoms. Weighed 4 pounds, 8 ounces. Child was seen by Dr. Holt in consultation. Result of this examination was negative. No tumor could be detected, no evidence of increased peristalsis. Case did not seem to be one of stenosis, but of difficult digestion.

On the theory that the mother's milk was at fault, child was put on cow's milk modified at the Walker-Gordon Laboratory.

FORMULA.

Fat	1
Sugar	6
Proteid	1

Three ounces to be given every three hours. As usual, after any change of food, child did not vomit for twenty-four hours. The following day it vomited only once, second day the old conditions returned, and it vomited four times about one hour after nursing. Formula was now reduced and a split-proteid substituted according to the following formula:

.75.....	Fat
5.50.....	Sugar
.50.....	Casein
.50.....	Whey

Three ounces every three hours, as before. This was followed by the usual symptoms, but the respite was brief and the old symptoms soon recurred. At this time the mother, who had been drawing her milk by means of a breast-pump, insisted upon nursing the child again, although she was warned that it might make matters worse. After the attempt the baby vomited three times within an hour, and the maternal nursing was permanently discontinued.

May 1st.—Symptoms continued as before, still using the split-proteid, the child still vomiting several times a day. There was severe and persistent pain after every feeding, which was usually relieved by lavage.

May 2d.—The cow's milk was discontinued. Baby was put on condensed milk, one-half teaspoonful to 4 ounces of weak barley-water, and of this 2 ounces were given every three hours. This feeding was continued for three days, but with no improvement at all. Child vomited almost every time.

May 4th.—Everything was returned; did not retain even hot water.

May 5th.—A wet nurse was obtained; a healthy-looking Finn, whose baby, three weeks old, weighed 12 pounds. She had an abundance of milk. Child was allowed to nurse every three hours for five minutes. For the first day, as usual, it kept all feedings and slept well. Second day vomiting began as before.

May 7th.—Child vomited every feeding, although the period of nursing had been decreased to three minutes. The wet nursing was stopped and the child was put on barley-water alone. Movements still good and frequent as before. Weight, May 7th, 8 pounds, 2 ounces. To-day for the first time distinct peristaltic waves were noticed. They were very striking indeed; looked like small balls being moved rapidly under the skin from left to right, stopping abruptly near the median line; sometimes a double wave followed in quick succession. Stomach washed two hours after feeding and 4 ounces obtained, although the child had vomited in the interval. The diagnosis of pyloric stenosis seemed certain.

Immediate operation was advised. Operation took place at six o'clock on the same day.

OPERATION BY DR. F. HARTLEY, ASSISTED BY DRS. KENYON
AND A. S. TAYLOR.—ANESTHESIA, CHLOROFORM AND
ETHER, AS REQUIRED, BY DR. T. L. BENNETT.

The abdomen, which had been prepared with soap poultice, was at this time washed with green soap, sterile water and ether. No abdominal tumor or mass of any description could be discovered by palpation. An incision was made in the median line extending from 2 inches below the xiphoid cartilage to a point 2 inches below the umbilicus (3 inches). Hemorrhage was arrested and retractors revealed the stomach and pylorus. The latter was occupied by a well-circumscribed, smooth and hard mass 1 inch in diameter. Inversion of the stomach wall upon the mass showed it to occlude the orifice and to leave only a small indentation to be felt by the finger. Gastroenterostomy was determined upon, because the work to be done would be in normal tissue and because feeding could be begun at once, and moreover because the remote results are very satisfactory. For these reasons pylorodiosis, pyloroplasty or pylorotomy were not chosen. The transverse colon was immediately brought out of the abdomen and the posterior wall of the stomach was exposed through the gastrocolic layer. The jejunum was picked up and applied to the posterior surface of the stomach near the greater curvature and the pylorus. The loop of intestine between the duodenum and the gastrojejunal opening was just enough to easily reach without any undue tension. After application of the stomach and intestine, Dr. Taylor held them with his finger while the suture was made. This was easily accomplished. There was no escape of the stomach or intestinal contents, nor was it difficult to maintain an exact alignment of the cut edges of the stomach and intestine during the suturing. The stomach and intestinal walls were united by two rows of fine silk sutures. The first row was interrupted and penetrated all coats. Second was continuous and penetrated the serous, muscular and submucous coats. This part of the operation occupied twenty-five minutes. The stomach and intestines were now replaced in the abdomen and the abdominal wall was sutured with deep catgut and superficial silk worm-gut.

Child's condition after the operation was very poor; pulse small and almost imperceptible, too rapid to count. Surface was cyanotic and extremities were cold. A hot saline enema at a

temperature of 115°F. was given while the child was in an inverted position. Hot-water bags applied, and in a few minutes conditions began to improve. At 6:50 the vital condition had so improved that the child was put to bed in its carriage with hot-water bags around and beneath it. It vomited several times from the effects of the anesthetic. One hour after the operation another hot saline enema was administered and partially retained. Two hours later a nutrient enema consisting of:

1 ounce peptonized milk.
1 ounce salt solution.
20 drops of panopepton,

was given and retained. Temperature at midnight was 102° , rose to $103\frac{1}{2}^{\circ}$ by noon of the following day. Albumin-water in five-drop doses up to a dram had been given every hour through the night and all vomited.

At Dr. Hartley's visit about noon, he ordered the child's position changed from supine to a sitting posture, and ordered it to be kept always with the trunk at an angle of 45° to facilitate stomach drainage. The effect of this manœuvre was immediate. Frequent vomiting stopped. Rectal alimentation was continued at intervals of six hours.

May 9th.—Two days after operation, morning temperature 102° . An attempt to clean the bowels by irrigation yielded a small yellow stool and much flatus. One dram of breast milk from the wet nurse, mixed with an equal part of albumin-water, was given by the mouth every half hour and was retained and the quantity gradually increased. In the afternoon child vomited large amount of green fluid twice. Four light yellow movements. Temperature rose again in the afternoon to 103° .

May 10th.—Rectal feeding discontinued, as it seemed to produce considerable irritation. Child cried after each enema, none of which were retained. It passed much flatus and was uncomfortable most of the time. Rectal feeding was probably partially responsible for the continued temperature. Child allowed to feed entirely from the breast.

Four days after the operation child was nursing every two hours for three minutes. Temperature had fallen to 100° ; stools still loose and small. From this time on it continued to improve slowly. Still vomited two or three times a day large

amounts of frothy green fluid; but was allowed to nurse ten minutes every two and one-half hours. A week after the operation improvement had been gradual. Vomiting about the same. Weight with clothes on, 8 pounds, 4 ounces. Child weighed before and after every feeding and nursed until it had taken 3 ounces.

May 17th.—Had gained 2 ounces in weight, vomited only once daily, had two green stools daily.

May 21st—Two weeks after the operation. Weighed for the first time without its clothes; weight, 7 pounds and 12 ounces.

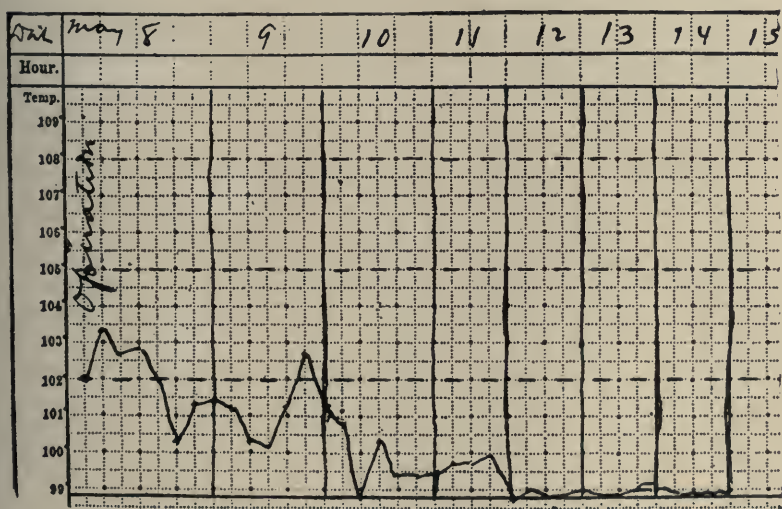


CHART SHOWING TEMPERATURE AFTER OPERATION FOR PYLORIC STENOSIS.

Continued to improve steadily in every respect, but still vomited occasionally frothy green material, stools partially formed, but always light green.

June 8th.—Child has vomited only once in ten days, and then right after nursing, probably being caused by too much handling. Was allowed to go out doors to-day for the first time. Weight, 8 pounds and 14 ounces.

The further history of the case has been uneventful. Child has gained slowly but steadily; has never been able to digest average food for a child of its age; has been fed most of the time

from the Walker-Gordon Laboratory and has never been able to digest a formula stronger than:

2.50 Fat.
.7 Sugar.
1.25 Proteids.

It had two or three attacks of acute indigestion and diarrhea during the summer, during which the food was frequently changed. The green stools persisted for four months after the operation, which was evidently due to delayed admixture of the bile with the food.

At the time of writing, child weighs 15 pounds, has good color, exceedingly bright, sleeps well and digests well, provided its food is not pushed above the formula given above. It is very active and seems in perfect health.

Cathelin's Method (Epidural Injections) in the Treatment of Incontinence of Urine.—Bruni deals (*Riforma Medica*, December 2, 1905) with the now well-known method of Cathelin for treating "idiopathic" incontinence of the urine. He followed Cathelin's technique, injecting a physiological salt solution with the addition of 1 gram of cocain per 100 c.c. of the liquid, later substituting the new anesthetic, stovaine, in the same proportion. He treated in all 23 children with enuresis. Of these, 7 were cured after one or two injections; 10 were markedly improved and may be cured ultimately, while 10 were adolescents, in whom the results of the treatment were negative. He also succeeded in greatly benefiting some cases of spermatorrhea, and of painful cystitis, by means of these epidural injections.—*New York Medical Journal*.

Influence of Alkalies on Degree of Acidity of Urine in Anemia.—Sodium citrate and sodium bicarbonate are able to render the urine alkaline in anemia. In some instances, however, especially in cases in which there is enlargement of the liver, Moraczewski found (*Zeitschrift für Klin. Med.*, Vol. LVII., No. 2) that this alkalinizing action is retarded for several days. On suspension of the alkali the urine becomes excessively acid, with increased secretion of ammonia and oxalic acid. Anemias without enlargement of the liver are accompanied by normal relations between the nitrogenized elements.—*Journal of the American Medical Association*.

ARCHIVES OF PEDIATRICS.

MARCH, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

COLLABORATORS:

A. JACOB, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

Contributors and Correspondents, see page III.

THE DIAGNOSIS OF SCARLET FEVER.

The diagnosis of scarlet fever, although at times presenting many difficulties, can almost invariably be made positively if the case has been seen from the beginning and every symptom carefully noted.

In the following remarks, I shall confine myself entirely to deductions drawn from my own experience.

In arriving at a diagnosis, the course of events in a typical case should always be kept in mind, as there is a corresponding regularity in the appearance of the symptoms, whether the case

be mild or severe. As a rule, the most severe cases of this disease live four or five days before death ensues. I have never seen a case die within twenty-four hours from onset. It might not be amiss to say here that scarlet fever practically never occurs during the first year of life. During the number of years that I have observed this disease, I have seen but 2 cases under one year (both aged eleven months).

With the usual sudden onset, with disturbances of the stomach, nausea or vomiting, and occasionally convulsions, the diagnosis is based on the following objective symptoms: Condition of the tongue, the temperature, the pulse-rate, the rash and the condition of the throat.

The tongue, in the majority of cases during the entire course of this disease, shows nothing more than the ordinary fever coating. The real denuded strawberry tongue, *i.e.*, a bright-red tongue with large papillæ and either no coating or only a slight coating on the posterior half, appears on the fourth or fifth day; and, occurring *then*, is of the greatest significance. Such a tongue seen on the first or second day of the disease should carry no weight as a diagnostic feature; for example, a case of pneumonia on the second day presented a diffuse general erythema, and a tongue typical of scarlet fever of about the fifth day. The rash being the only other suggestive symptom of scarlet fever, that disease was excluded. The desquamated tongue frequently persists for several weeks. The tongue, heavily coated, with red edges and prominent papillæ, which is so often said to be characteristic of the fever on the second and third days, occurs in so many other conditions that I consider it wholly unreliable as an aid to diagnosis.

Fever is, as a rule, present. There are exceptional cases where the temperature never goes above 99°F., the cases being typical in other respects. In young children the typical temperature curve is rarely seen. On the contrary, the temperature may be most irregular.

The pulse is invariably rapid, being elevated more than the

usual eight or nine beats for each degree of fever. This rapidity of the pulse was present in the few nonfebrile cases that I have seen, and is often an aid to diagnosis.

The rash may appear within a few hours, and always appears within forty-eight hours after the onset of the disease, and regularly travels downward. It first appears on the neck and chest, at times not reaching the lower limbs until the second or third day. If the case is seen as late as the third or fourth day, the rash on the trunk may have entirely faded. The typical punctate erythema is not always easily distinguishable, and the varying surface congestion frequently alters the appearance. To me the vasomotor paresis of the capillary circulation has been of little value. The rash may be well developed on the face, and at times the circumoral pallor is present. I cannot say that my experience includes any cases of relapsing or recurring rashes. It must not be forgotten that the regular erythema may be accompanied by blotches resembling measles, and appearing usually on the extremities. With the erythema there is frequently a vesicular eruption, and when this is visible it may be well developed, especially on the extensor surfaces of the hands and feet. Of the irregular rashes frequently mentioned, I cannot say that I have ever seen one limited to one limb or to one side of the body which I was willing to regard as diagnostic of scarlet fever. There is, of course, no doubt that the erythema may be very faint on some parts of the body and of a deeper hue on other parts; and this condition may vary from day to day. In some severe cases, the rash is well developed only in the flexures of the joints. The cases of delayed appearance of the rash are usually cases of follicular tonsillitis or diphtheria occurring during the course of one of these diseases. In the majority of cases there is no similarity between the erythema of diphtheria and the rash of scarlet fever. In the majority of cases I have observed, a scarlatinal rash, with a rise in temperature, appearing in the course of diphtheria, has been due to a mixed infection. An immediate diagnosis, however,

is not usually possible. Such cases sent to wards with scarlet fever cases have in no instance, to my knowledge, developed scarlet fever anew.

The "antitoxin rashes" occurring during convalescence of diphtheria, or several weeks after the injection of the serum, have raised notable difficulties of diagnosis. If such a rash be accompanied by a reinfection of the throat, it is probably due to infection with scarlet fever.

The throat always presents a different appearance from the normal of the suspected patient. In fact, it might be said that the disease begins with a sore throat, which may be so mild as not to be noted by the patient. On examination redness is seen on the tonsils and on the pharynx, and this latter progresses to the pillars and to the soft palate and at times to the hard palate. On the roof of the mouth, a punctate erythema is frequently seen. Accompanying the redness, there is frequently an exudate on the tonsils, giving the appearance of a follicular tonsillitis or diphtheria.

It will be seen from the foregoing, that the rash and the inflammation of the throat are necessary to make a diagnosis. In measles, malignant small-pox and varicella, erythema may precede the regular eruption by a few hours to several days. The antecedent erythema of malignant small-pox is always accompanied by subconjunctival hemorrhage, while that of measles is accompanied by the characteristic prodromal symptoms. The morbilliform eruption of rubella presents no difficulty for diagnosis, but the scarlatiniform rash of this disease frequently makes an exact diagnosis impossible. At present there are in this city a number of cases in which the diagnosis cannot now be made between German measles and scarlet fever. The patients with German measles apparently recover in about four days. They do not desquamate, or not freely, as in typical scarlet fever. One frequently is in doubt as to whether they are rubella, mild scarlet, or cases possibly of Filatow-Dukes' disease. (?) The only positive

points of difference between these cases and plainly evident cases of scarlet fever is the speedy recovery and a pulse-rate lower than that found in scarlet of corresponding severity. Scarlatinal erythema with negative throats are probably not scarlet fever. Such rashes are seen with or without fever, and in a fever often do not appear at the proper period. They are sometimes seen in septic cases, following burns, again are drug-rashes from surgical applications, or from drugs taken internally, and again are the rashes of various infectious diseases, such as malaria, varicella, pneumonia, typhoid fever and small-pox. In measles and influenza, with nasopharyngeal catarrh, the throat is red; but in both of these conditions, as well as in malaria, typhoid and pneumonia, the erythema is usually diffuse, not appearing like the typical scarlet fever rash, and the future course of the disease, with its accompanying symptoms, leads to a correct diagnosis.

The frequency of desquamation in many affections makes this condition in itself of little value. The time of its occurrence is of importance. Peeling in scarlet fever does not begin on the hands before the latter half of the second week. This time of desquamation, together with the history of relapses and recurrences, should be of assistance in exfoliating dermatitis, of which I have seen but very few cases. I am fully convinced that there are mild cases of scarlet fever where desquamation may be so scanty as to be entirely overlooked.

A. R. BRAUNLICH, M.D.

CALORIC VALUES IN INFANT FEEDING.

In the February number of ARCHIVES OF PEDIATRICS there were two interesting communications upon this subject—one by Dr. J. J. Thomas, on the "Importance of the Estimation of Caloric Values," and the other by Dr. G. W. Moorehouse, on the "Determination of the Caloric Value of Percentage Milk Mixtures." It is well to have this subject brought prominently before pedi-

atrists, since comparatively little has been written upon it in the various text-books on the diseases of children. The statement by Dr. Thomas, "I fail to find any reference to the caloric value of food in any American text or reference book on pediatrics," does not represent, however, the measure of appreciation by American pediatricists of caloric estimations. While it is quite true that comparatively little stress has been laid upon this matter by American teachers, it is altogether an error to say that no attention has been paid to it. The subject came up for discussion in the American Pediatric Society several years ago; and the consensus of opinion then was, that the method was not sufficiently wrought out to be practicable in infant feeding. There have been several papers dealing with the use of caloric values in infant feeding published in the last few years, notably those by Morse, Edsall and Wentworth. In their lectures upon infant feeding, both Holt and Rotch give due attention to the subject and teach the caloric values of milk mixtures to their classes. Moreover, Koplik, in his text-book, second edition, published early in 1906, has a complete discussion and synopsis of the whole subject; and Rotch, in his last edition, 1906, discusses the subject with regard to both full-term and premature infants.

As a matter of fact, about all of the attention is paid to the subject which its practical value warrants, because it is at best only a theoretical method. It is, perhaps, possible to set the minimum limit for the caloric value of food for an infant, but not the maximum. Moreover, it is difficult, if not impossible, to apportion properly the relation of the caloric values of the fats, carbohydrates and proteids. As with breast milk, the progress of the baby must be the final test, rather than any chemical analysis or caloric estimation of the milk. If the infant is not doing well, a study of the caloric values of his food may explain why he has not thrived; but so different are the digestive and metabolic capacities of different infants that a wide range of caloric values must be allowed, whatever the norm established.

Society Reports.

REPORT OF THE MILK COMMISSION OF THE MEDICAL SOCIETY OF THE COUNTY OF NEW YORK TO THE SOCIETY, OCTOBER, 1906.

It is just six years since the organization of a Milk Commission under the auspices of this Society, and inasmuch as the work of this Commission has been quite successful, it may be worth while to review briefly what it has accomplished.

After the appointment of a Commission in the fall of 1900, the work of interesting dairymen was undertaken. During the ensuing year considerable progress was made possible through the co-operation of the Rockefeller Institute and the New York City Board of Health, the former undertaking the expense of inspection, while the latter provided facilities for the bacteriological examinations. This movement also created a public demand for milk supervised by this Commission, so that at the end of the first year when the aid of the Rockefeller Institute was withdrawn, the dairymen saw that it was to their advantage to contribute such amounts as were necessary in order to support the machinery of the Commission.

At the end of the first year the Commission was enlarged, new rules for the production of certified milk were elaborated, and a second grade of supervised milk, which could be produced at a less cost, called inspected milk, was authorized.

By the end of this second year 3,000 quarts of certified milk were being produced daily on nine farms and sold by nine dealers in New York. A considerable amount of inspected milk was also marketed. Our inspector during that year made eighty-six visits to farms. Three farms were then lost owing to the organization of the Milk Commission of the Medical Society of the County of Kings. Since then no Kings County milk has come under the supervision of this Commission.

The following year ten farms were producing 4,300 quarts of certified milk and 1,500 quarts of inspected milk—a total of 5,800 quarts.

The next year twelve farms were producing 5,138 quarts of

certified milk, which were being sold by ten dealers, while 3,040 quarts of inspected milk was marketed.

In 1905 fifteen farms were producing 7,062 quarts of certified milk, which was being sold by thirteen dealers; and this, together with 3,240 quarts of inspected milk, made a total output of 10,302 quarts, and the number of visits to the farms by our inspectors had increased to 208.

This year 9,567 quarts of certified milk are produced daily on nineteen farms and sold by thirteen dealers, which, together with 2,800 quarts of inspected milk, makes a total of 12,367 quarts, while the number of visits to farms has increased to 329.

During these years the interest of the dairymen has made it possible to have somewhat more rigid requirements for the production of this milk. During 1903 a seal was adopted to prevent manipulation of the milk after it left the farm, and the farmers were required to stamp on the pasteboard cap the date of milking. During 1904 the tuberculin test which had previously been recommended was required, and during the same year postal cards were prepared on which the dairymen were required to send notification of any contagious disease on the place. More recently a set of fines has been established for neglect in complying with the requirements for the production of certified and inspected milk, and a score-card for computing the excellence of the different dairies has been prepared and applied to the rating of the dairies.

Inspected milk is sold in bottles for 8 cents a quart, while certified milk is sold at from 12 to 20 cents. That sold for 12 cents is produced in compliance with the requirements of the Commission, while that sold at a higher price is often produced under extra precautions not required by the Commission. The price demanded for the milk gives, as a rule, only a fair profit to the dairymen, since such milk cost ordinarily from 6½ to 8 cents a quart to produce at the farm. The Commission has assumed no control over the prices charged by the dealers, confining its attention merely to the quality of the milk marketed. The Commission is not instrumental in the movement to raise the price of ordinary milk.

The finances of the Commission have been kept on a satisfactory basis. During 1902 our income was about \$1,200, which, owing to the liberality of our City Board of Health and a pass kindly provided by the New York Central Railroad Company, was sufficient to cover our expenses at that time. The annual income

has increased from year to year, as have our expenses. Last year, on account of the withdrawal of the railroad pass, it was found necessary to slightly increase the charges for the dairymen, but this was met with practically no objection on their part. Last year our income was \$3,201, which was sufficient to pay the salary of the inspector as well as her traveling expenses, the cost of the collection of samples of milk, the inspection of the handling of the milk in New York, and the expense for stationery, etc.

A copy of the postal card used for reporting diseases among the employees or their families is here reproduced:—

.....

INSPECTOR FOR THE MILK COMMISSION:

I hereby answer for the information of the Milk Commission, for the week of the above date, the following questions:—

Are any of the men handling the milk at your farm ill with any contagious disease?.....

Is there any contagious disease in the families with which they are connected?.....

Have any employees been in contact with contagious disease, and then excluded from the milking place?.....

Respectfully yours,

.....

Copies of the two score-cards used for rating the farms can be obtained upon application to the Secretary of the Commission.

The Rapidity of Absorption of Odors by Milk.—F. Bordas and Toutplain (*La Presse Médicale*) have determined, in their researches which they have made with the aid of formic aldehyde, that this is absorbed most rapidly by milk which has been freshly drawn. This absorption of aldehyde by milk is so rapid that it has been suggested to use the impregnated milk for revealing traces of formic aldehyde in the air.—*Medical Record*.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. HENRY HEIMAN,
DR. A. W. BINGHAM,
DR. G. R. PISEK,
DR. L. C. AGER,

DR. J. HOWLAND,
DR. V. AGOSTINI,
DR. M. NICOLL, JR.,
DR. ALFRED F. HESS.

PATHOLOGY.

Bookman, A.: The Physiological Importance and the Clinical Value of Ehrlich's Dimethylaminobenzaldehyde Reaction in the Urine of Children. (*Jahrbuch für Kinderhk.*, July, 1906, p. 203.)

Neubauer first proved that this reaction is due to urobilinogen, which is a product of putrefaction of bilirubin and blood pigments in the intestines. Urobilinogen is later partly oxidized into urobilin. In the urine of normal children this reaction is absent in the cold, and is only faintly marked on heating. The reaction is more marked in the urine of patients suffering from intestinal catarrh, enteritis and intestinal putrefaction. In jaundice due to obstruction of the biliary passages its absence is of considerable diagnostic importance, as it indicates the nonpresence of bile pigments in the intestines. Bookman found no increase of the reaction in scarlet fever, as claimed by some investigators. But in the urine of diphtheria he found a well-marked reaction in 11 out of 15 cases.

HENRY HEIMAN.

Argutinski, P.: A Contribution to the Knowledge of Congenital Myxedema and Its Skeletal Growth. (*Berliner Klin. Woch.*, September 10-17, 1906, pp. 1,209, 1,251.)

The author reports a typical case that showed stunting of growth, depression of root of nose, marked delay in ossification of the cartilages, peculiar changes in the skin, marked changes in the growth of the hair, anidrosis, low body temperature, constipation, protuberant abdomen and low position of the umbilicus. He considers it a case of congenital myxedema, as the father noticed the depressed nose at time of birth, and there was no centre of ossification in the carpus, which normally appears during the first month of life. The different epiphyses, investigated by means of the X-rays, showed changes in ossification varying from a few months to a year and a half, whereas the height corresponded to that of a child two and one-half years of age. The

author attributes this to the fact that the growth in length of the bones of the extremities is less delayed than the growth of bone at the epiphyses. The delayed growth occurred in this case in the following order:—

- (1) Ribs (least delayed).
- (2) Long bones of the extremities and trunk.
- (3) Cartilaginous epiphyses of the long bones of the extremities.
- (4) The cartilaginous short bones of the upper extremity.

So the author concludes that in congenital myxedema there is least delay in the growth of bone in those parts of the skeleton which normally show the greatest degree of growth.

HENRY HEIMAN.

Huebschmann, Paul: Spirochetæ Pallida and Changes in the Organs in Congenital Syphilis. (*Berliner Klin. Woch.*, June 11, 1906, p. 796.)

The author found no spirochetæ in the lungs and spleen; a moderate number in the kidneys, suprarenals, liver, placenta, and walls of the cord; and a very large number in the pancreas and thyroid, the organs which in this case showed the most marked and most recent syphilitic lesions. The spirochetæ seemed to be most abundant in the connective tissue and the walls of the blood vessels of the various organs in which they were found.

HENRY HEIMAN.

Baumann, Louis: Character of the Urine in Rickets. (*Jahrbuch für Kinderhk.*, July 18, 1906, p. 212.)

Baumann could not confirm the presence of a peculiar odor in the freshly passed urine of rachitic children. He found the urine acid in reaction and no increase in the amount of ammonia.

HENRY HEIMAN.

Thiemich, Martin: Pathological Examination of the Parathyroids in Cases of Infantile Tetany. (*Monatsch. für Kinderhk.*, July, 1906, p. 165.)

The author found absolutely normal glands in 3 cases which came to autopsy.

HENRY HEIMAN.

MEDICINE.

Barlow, H. W. L.: A Case of Malignant Jaundice Following Scarlet Fever. (*British Medical Journal*, August 4, 1906, p. 254.)

A girl, aged six and one-half years, was taken ill on the forty-second day of convalescence from scarlet fever with headache, malaise, sore throat and moderate pyrexia. The following day the conjunctivæ and skin were slightly jaundiced; the child was somnolent. She grew gradually worse, and on the third day her condition was grave. In the afternoon the child was profoundly ill; she was partially unconscious, delirious and restless. Death occurred less than three days from the onset, being preceded by a slight convulsion. This case is of interest on account of its short duration, fatal issue and connection with scarlet fever.

A. W. BINGHAM.

Conner, L. A.: The Clinical Diagnosis of the Status Lymphaticus. (*New York State Journal of Medicine*, July, 1906.)

The status lymphaticus may have a direct relation to every department of clinical medicine and surgery. Its diagnosis therefore becomes a matter of very considerable importance.

Conner asks can such a diagnosis be made during life, and answers that, although a positive diagnosis may be difficult, the condition may be recognized with a fair degree of certainty if care and trouble are taken in the examination.

This examination should include: (1) the lymphatic apparatus (*e.g.*, tonsils, adenoids, epiglottis, etc.); (2) the spleen and thymus (the thymus dullness should disappear normally about the fourth or fifth year); (3) the heart and accessible arteries; (4) the body for evidences of infantilism; (5) the skeleton for evidences of rickets; (6) the thyroid gland; (7) the blood (for increase of lymphocytes).

When any number of the above stigmata are found in the same individual, then they are of diagnostic significance. Especially in the case of anticipated operation in children and young adults should this examination be made, instead of an examination of the heart only.

G. R. PISEK.

Rough, J, and Josserand: The Relation of Enterocolitis to Adenoiditis in Infants. (*Revue Mensuelle des Maladies de l'Enfance*, August, 1906, p. 351.)

Thirty-seven cases in which enterocolitis in some form was associated with adenoiditis are cited as leading to the conclusion of a causative relation. Thorough removal of the adenoids cured the intestinal trouble. The authors believe that the constant swallowing of the mucopus interferes with gastric secretions and infects the intestinal tract.

As a result of these observations the writers make a routine examination, and always expect to find the two conditions associated in greater or less degree. The casual observations of many writers are given in support of the theory.

[It is reasonable to suppose that the more severe forms of adenoiditis with a copious discharge of pus and mucus might easily produce digestive disturbances. On the other hand, it is preposterous to overshadow all other causes of gastroenteric affections by one so accidental. In many instances there is probably some form of malnutrition underlying both lesions. Probably few children with an enteritis would undergo the searching examination for lymphatic enlargement practiced by the authors with entirely negative results. It seems more reasonable to suppose that the adenoiditis is the result of the enteritis than the opposite.]

L. C. AGER.

Biedert, Charles C.: Otitis Media as a Complication or Sequel of Scarlatina. (*American Medicine*, July, 1906, p. 210.)

The author emphasizes the importance of careful, painstaking treatment both prophylactic and curative. He reviews some of the statistics of frequency and of serious results, pointing out the wide variations in the figures of different epidemics.

The line of treatment recommended is routine examination, early incision, gentle irrigation, followed by insufflation of aristol or other antiseptic powder and light packing with gauze. The gauze should reach to the seat of the perforation and should be changed as often as the discharge indicates.

The throat, nose and nasopharynx should be kept as clean as possible to prevent reinfection.

L. C. AGER.

Rosenberger, R. C.: Recent Studies in Measles. (*American Medicine*, June, 1906, p. 139.)

The author gives a brief review with bibliography of the reports of successful inoculation of measles by various investigators, and also cites numerous bacteriological findings. He is of the opinion that in all the exanthemata the germ is of the cytorycte variety, and gives his own findings in confirmation of that view.

L. C. AGER.

Risel, Hans: Körpergewichte und Milchdiät bei Scharlachkranken Kindern. (**Body Weight and Milk Diet In Scarlet Fever.**) (*Zeitschrift für Klin. Medizin*, Vol. LIX., 340.)

It has been affirmed by various authors that an exclusive milk diet in scarlet fever causes a very marked loss in weight, which is recovered from with difficulty, and that on this account other things should be given with the milk, such as cream, bread, cereals, etc. In order to investigate this the author weighed eighty-two children every three days during the course of scarlet fever. These children were from eighteen months to thirteen years of age. They were fed for the first three weeks exclusively on milk; in the fourth week bread and soup were added, and in the fifth week vegetables. They were given what milk they wanted in moderate but not excessive quantities, varying from 24 ounces to 2 quarts a day, the large amounts only in older children. The greatest loss in weight was reached on the average about the twelfth day, and from that time onward there was almost without exception a slow but regular gain, and the children were discharged weighing more than on their entrance into the hospital. Even on an exclusive milk diet the gain was very decided. This investigation shows, without doubt, that in scarlet fever even with only a small ingestion of milk there is not the slightest danger of inanition.

J. HOWLAND.

Carpenter, Geo.: Congenital Hypertrophic Stenosis of the Pylorus. (*Medical Press and Circular*, July 4, 1906, p. 7.)

Three cases of this condition are reported in detail. All of them were operated upon with a fatal result in each case. The ages of the children were respectively three weeks, five weeks and four weeks.

J. HOWLAND.

Menabuoni, Gino: Relapses in Diphtheria. (*Rivista di Clinica Pediatrica*, October, 1906, p. 721.)

In a quite exhaustive article, in which the histories of 39 cases are recorded, Dr. Menabuoni shows that the interval between two attacks of diphtheria is very variable, ranging from a few months to several years; that the hypothesis of some who assert that the region locally affected is different in each attack cannot be confirmed, for in 18 of his cases it was laryngeal diphtheria that his little patients had in both attacks. Although he admits it to be the rule that the second infection is the milder, in 7 of the 18 laryngeal cases was the latter the more grave instead of the former. The percentage of relapses he puts at 1.7 per cent., which does not differ widely from those of other authorities. He states that it has increased since the use of serotherapy and this suggests to him that the antitoxin has little efficacy over the pathogenic agents themselves, and by saving more patients, it tends indirectly to propagate the malady, at the same time rather increasing the individual susceptibility to repeated infections.

V. AGOSTINI.

Munch, Francis: Résumé and Deductions from a Medical Trip Through the United States. (*Archivos de Ginecología, Obstetricia y Pediatría*, October 25, 1906, p. 453.)

Having reached the end of his series of articles in regard to the actual conditions of the medical sciences in the United States, the writer concludes:—

That we have a decided preference for surgery, which is explainable in part on account of the progress made in the last few years on this side of the Atlantic, but which he attributes mainly to the national character of the North American, which admirably adapts itself to the surgery of to-day—vigorous, enterprising and often daring. The American pace is too swift to allow time for research, and we prefer to learn and practice the finding of others. Our particular merit consists in discriminating between good and bad and with excellent criterion, born of freedom from subjection to this or the other school, we select and retain what is best and modify or combine it in accordance with circumstances.

There is an exaggerated enthusiasm in America regarding

laboratory work, but on this point also, the writer states, very little is done that is really original. We employ, rather, the methods of Europe, at times advocating them without enough foundation for so doing. Our clinical instruction is painfully neglected, and we have to look for it in Europe and particularly in France; hence the yearly invasion *en masse* of the European hospitals by the American physicians. The established current in the domains of medicine between the new and the old world cannot for the moment be but unilateral, that is, from America towards Europe, and a strict reciprocity cannot exist as yet. But there is such a thing as the specifically American medicine, and, judging by the incessant labor, the indefatigable energy and the constant and rapid progress of medical America, it is easy to glimpse, at the day, perhaps not so far off, when the healing art in the Western hemisphere will march abreast of the social and economic attainments of North America.

V. AGOSTINI.

SURGERY.

Dunbar, Henry J.: Acute Infantile Intussusception.
(*Scottish Medical and Surgical Journal*, August, 1906, p. 97.)

The observations were made at the Edinburgh Royal Hospital for sick children, and number 57 recorded cases. Intussusception is the cause of one-third of all cases of intestinal obstruction at all ages. In children three-quarters of the cases are due to this cause. It is much more common in males than in females; in the proportion of three to one.

The writer enters at length into the anatomy of this condition. Of the four recognized varieties, ileocecal, colic, ileocolic and enteric, the first is regarded by several authorities as by far the most frequent. A rare form is that in which the appendix is turned completely inside out and projects into the lumen of the cecum. A less uncommon variety, that of the intussusception of the small intestine into Meckel's diverticulum.

The various pathologic changes take place in rapid succession.

Causes of the frequency of this disease in infancy, while still obscure, are attributed to the state of unstable, nervous equilibrium of the intestinal tract. The exciting cause is often apparently an acute gastrointestinal disturbance, but more frequently

not to be determined. The frequency of the ileocecal variety is probably due to the projection of the ileocecal valve and terminal portion of the ileum into the colon, and the mobility of the cecum and colon, which permits a tendency to invagination from change of relative position.

The symptoms derived from a number of detailed cases are remarkably uniform and characteristic. The onset is usually sudden, but in almost one-half the cases there was a history of previous digestive disturbance. The first symptom is severe abdominal pain, cramp-like in character, which is believed to be synchronous with the commencement of invagination, as is also the indefinite history of indigestion, vomiting and restlessness. The pain continues to come on at intervals of varying length, until the patient becomes moribund; during the painless intervals the patient is fairly comfortable.

The second important symptom is vomiting, which is violent in character and frequently repeated; first, of the contents of the stomach, later of only a little yellowish fluid. In only one case of the series was the vomiting stercoraceous in character. The third and most characteristic symptom is the passage of blood and blood-stained mucus from the bowel. In only 3 of 59 cases was this absent. It is often accompanied by a great deal of straining. This symptom, as a rule, does not appear until four or five hours from the beginning of the attack, but the time of its occurrence is variable, and it may be the first observed symptom.

At first there is usually some diarrhea, to be followed later by complete constipation in every case. In one case of typical ileocecal invagination a normal stool was passed one-half hour before operation. Finally, the characteristic collapse takes place very rapidly.

Physical signs: Varying state of collapse. Respiration somewhat increased. Pulse rapid. Temperature in early stages normal or subnormal, later rising 2° or 3°, coincident with the inflammatory changes and gangrene. The abdomen is generally but moderately distended; asymmetry may be seen. The sausage-shaped tumor may usually be made out without difficulty by careful palpation.

In 57 cases in which the location of the tumor was stated, in 5 it was in the upper abdomen, in 24 on the right side, and in 28 on the left. Of the 21 ileocecal cases that recovered, in 11 it was on the right side, or upper part of the abdomen, and in 10 on the

left. Of the 24 that died, in 5 it was on the right or upper part, in 18 on the left, and in one case the position was not stated. The situation of the tumor, indicating the length that it has traveled, the "*signe de Dance*" (emptiness of the right iliac fossa) is not to be relied on, but was present in 3 out of 7 of the cases examined by the writer. Of 55 cases, in which a rectal examination was made, the tumor was palpable in 29, and was felt as a simple nodular projection with no dimple corresponding to the lumen. The tumor may project from the bowel (in 5 per cent. of 103 cases—Wiggin).

Diagnosis: Sudden, severe abdominal pains, followed by vomiting, especially when occurring in a healthy child of six months old, or thereabouts, should make one think of the possibility of this condition. If passage of blood be associated, the diagnosis is almost certain. The presence of a tumor, made out by abdominal palpations with an anesthetic if necessary, or by the rectum, furnishes absolute confirmation.

Conditions from which intussusception must be differentiated are ileocolitis, or any form of diarrhea, especially when accompanied by passage of blood, rectal polypus, congenital obliteration of the bile ducts, or organic disease of the liver and purpura hemorrhagica.

Prognosis: If unrelieved death takes place in from one to three days. Recovery may rarely occur through spontaneous reduction, and still more rarely by sloughing and passage of the intussusceptum.

Treatment: Reduction by injection of air or water, preferably the latter, may be tried only in the early stages, or if for any reason laparotomy may not be performed, but should be immediately abandoned if not successful, and in any event performed with much caution, as the danger of rupture is by no means remote. Laparotomy, as soon as the diagnosis has been made, with reduction by careful manipulation, gives the patient the best chance of permanent recovery. Recurrence may be guarded against at the time of operation by fixation of the colon or shortening the mesentery. Operations for the relief of an irreducible intussusception have been thus far hopeless.

MacGregor: A. N.: Intussusception. Statistics and their Story (*Ibid.*, p. 151), analyzes all the cases treated at the Glasgow Royal Infirmary and the Hospital for Sick Children

since 1893, numbering 123. They are divided into two series, the first comprising those which occurred between 1893 and 1903, 64 in number; the second those between 1903 and April, 1906, 59 in number. The tables would go to show that this disease is more frequently diagnosticated of late years and at a somewhat earlier period, and further, that the percentage of recoveries for cases of twenty-four hours, or less duration, has considerably increased. The death rate among those existing for over twenty-four hours is still very great. In regard to the success of hydrostatic treatment, the records are too incomplete to render conclusions of any value. The disease is shown to be one essentially of infancy, 74 per cent. of cases occurring in children of less than a year. Eighty-nine males were affected to thirty-four females.

Marnoch, John: Cases of Intussusception (*Ibid.*, p. 176), gives the detailed clinical history of 8 cases coming under his observation, including 1 in a boy of three, who recovered after the discharge of the intussusceptum per anum.

Greig, David M: On Intussusception (*Ibid.*, p. 185), describes 20 cases. The passage of blood is the symptom upon which, in his experience, most practitioners base their diagnosis. Unfortunately, this is not constant, and is frequently delayed beyond a time when it is possible to save a patient's life. Colic prolonged, recurring, and not yielding to ordinary treatment, justifies the administration of an anesthetic and palpation of the abdomen in search of a tumor. The position of the latter cannot be relied upon to indicate the anatomical variety of the disease. An ordinary bicycle pump is recommended as a handy means of inflating the colon. Manipulation being tried at first in the reclining position, and if not successful, with the patient inverted. Failure by these means justifies immediate laparotomy or median celiotomy.

Thyne, T. J.: Intussusception (*Ibid.*, p. 199), pleads for immediate laparotomy as soon as the diagnosis can be made.

[This series of articles constitute a most valuable contribution to the literature of a condition which, although by no means common, presents such a uniform symptomatology that every practitioner should recognize it at a glance, and, by making an early diagnosis, give the patient at least a fair chance of recovery through operative procedure, which is not to be hoped for after a delay of even twenty-four hours.]

M. NICOLL, JR.

Boyd, O. M.: A Case of Meningocele of Unusual Size. (*The American Journal of Obstetrics*, August, 1906.)

Boyd says that hernia of the meninges is not a very rare deformity in the newborn. The size of the tumor in his reported case warranted a description. The labor, astonishingly enough, was not complicated. The child was normal in size. An inch below the posterior fontanel was the large hernial tumor with a thin wall, and for the most part transparent. Fluctuation was elicited on pressure. The tumor exceeded the infant's head in size. The longest diameter was six inches; transverse diameter about five inches.

Radical cure by amputation was performed, and a rapid recovery followed. The child gained in weight and seemed well for three months, when it began to develop hydrocephalus. The infant is now six months old, and has characteristic symptoms of hydrocephalus.

G. R. PISEK.

Stern, Walter: Concerning the Final Results of the Lorenz Operation for the Bloodless Reduction of Congenital Hip Dislocation. (*The Ohio State Medical Journal*, November 15, 1906, p. 237.)

The author reviews 2,593 cases operated upon for congenital dislocation of the hip since 1900. Of these there have been 1,084, or 41.76 per cent., anatomic replacements; 187, or 7.22 per cent., functional results, divided among anterior transpositions, subspinal positions, or lateral appositions; 314, or 12.10 per cent., reported bad results.

Of untoward results and accidents but a small number are reported since 1900. Individual operators vary greatly as regards their results. Only such cases are tabulated as could be followed carefully subsequent to operation.

ALFRED F. HESS.

Broca, A.: On Chronic Appendicitis and the Early Diagnosis and Treatment of Acute Appendicitis in Children. (*The British Journal of Children's Diseases*, June, 1906, p. 231.)

(The Wightman Lecture of The British Society for the Study of Disease in Children.)

This paper presents the conclusions drawn from fifteen years of work on children in the Paris hospitals. Various phases of

the subject are touched upon. Apparently appendicitis in children is more frequent in France than in England, which the author thinks may be due to the difference in feeding rather than to epidemics of influenza. He is convinced that appendicitis is, in a great majority of cases, the result of an enterocolitis of some form, particularly mucomembranous colitis. This point is emphasized on account of the fact that some French writers [Dieulafoy in particular seems to have been responsible for this controversy] have declared that these two conditions never occur together. Broca has seen children die of appendicitis because the attending physician had this erroneous idea of antagonism.

After an enterocolitis the appendicitis does not show itself at once, because the process is chronic. This explains the fact that the condition is rare in very young children, although intestinal diseases are so frequent.

Attention is called to the analogy between appendicitis and the various lymphatic inflammations in the throat, although the supposed causative relation is not mentioned.

The symptoms of chronic appendicitis take the form of chronic intestinal indigestion, flatulence, alternating diarrhea and constipation, gastralgia, offensive breath, furred tongue, nausea, and later the various signs of chronic malnutrition. Careful examination at McBurney's point will usually show deep seated tenderness and often some signs of infiltration. In all cases of chronic "indigestion" or recurrent "indigestion," the physician may expect to find this trouble if he is on his guard.

The author insists that there is no medical treatment for appendicitis and in these recurrent attacks advises the "interval" operation.

Mistakes in diagnosis may be caused by pneumococcic or gonococcic peritonitis, by central pneumonia with abdominal symptoms, intestinal worms, and typhoid with sudden onset and irregular symptoms. Blood counts are useful, but must be carefully interpreted.

After trying various methods of operating, Broca believes that in most cases the McBurney technic is the best. In diffuse septic peritonitis he believes in operation, although the percentages of cures are, of course, small. In such cases he makes two or three free incisions and uses large rubber drainage tubes. Copious irrigation he has not much faith in, although he uses it at times.

L. C. AGER.

HYGIENE AND THERAPEUTICS.

Spivak, C. D.: The Use of Oxygen in Asphyxia Neonatorum. (*Medical Record*, November 10, 1906, p. 741.)

At the maternity department of St. Luke's Hospital, Denver, in desperate cases of asphyxia neonatorum a novel method has been adopted at the independent suggestion of two nurses.

A newborn babe, given up as beyond help, was made to breathe by the nurse, who turned a stream of oxygen into the nostrils of the baby. Another newborn was saved by the suggestion of a nurse to try a few whiffs of oxygen.

The writer believes that the plan deserves to be brought to the attention of the medical profession for the purpose of further research, discussion and experiment.

G. R. PISEK.

Pisek, G. R.: Some Unheeded Principles Involved in the Dietetic Management of Infants in Hot Weather. (*American Medical Journal*, August, 1906.)

Pisek shows the importance of body heat, humidity and perspiration in their relation to artificial feeding in hot weather.

Energy is an intangible ingredient embodied in the food. The utilized energy of food is transformed into heat and must be excreted. Heat is an excretion of the body as much as urea is. Body heat is excreted by conduction, radiation and evaporation. Sweating helps insufficient radiation and sweating is influenced by the relative humidity. Humidity and air temperature must be considered in feeding-cases.

Conclusions.—(1) In warm weather keep a light woolen garment over the abdomen to prevent sudden chilling of the skin and consequent heat retention by suppression of perspiration.

(2) Bathe infants twice daily.

(3) Give plenty of cool boiled water to drink, to replace that lost by evaporation.

(4) Pasteurize the food to retard its decomposition.

(5) If the weather is close or muggy, or the humidity is high, dilute the food to one-half with boiled water. In very humid weather, with high temperature, stop milk altogether, and feed gruels until the humid condition is past.

(6) On warm humid nights do not give milk feedings, because the humidity is higher at night than in the day time.

(7) For diarrhea give calomel or castor oil to eliminate decomposing food. Stop all milk feedings temporarily. If the air is hot, but dry, milk feedings may be resumed quite rapidly. If the relative humidity is high, feed gruels to reduce heat production and also to starve out putrefactive bacteria, and cautiously get back to milk feedings.

(8) Provide a circulation of air, as stagnant air soon becomes saturated with water vapor and no more perspiration can evaporate and absorb heat.

G. R. PISEK.

Klautsch, A.: The Treatment of Acute Gastrointestinal Disease in Infants. (*Der Kinderarzt*, July, 1906.)

The author states that we cannot as yet make a division of these cases based on bacteriological findings, but must content ourselves with a classification based on anatomy and clinical symptoms.

His treatment falls under the following subdivisions: A light form, the dyspepsia of infants, and a severer form, enteritis. Follicular enteritis and cholera infantum are not discussed at length, but their relationship is pointed out as a possible sequel to the above diseases.

The dyspeptic type is treated in the main by dietetic management, and often is the only measure necessary. "Medicine here would be of no use without dietetic management." Stop all food for the first twenty-four hours, substituting boiled water, and giving it not oftener than every three hours and not more than one litre per day. Castor oil is preferred to calomel if a purge seems necessary; if calomel is necessary large doses are recommended, 0.04-0.05 every two hours until the characteristic green stools appear. Rectal irrigation with saline solution may be used instead of a purge.

If there is persistent vomiting, stomach washing with a 1 per cent. saline solution, or 1 per cent. solution of Carlsbad salts.

A gruel is given before milk feedings are resumed, and then a gruel containing a small quantity of milk. If watery stools are persistent, tannalbin 0.5 four or five times a day, or colloidal bismuth oxid in a 10 per cent. solution in doses of 5 to 10 c.c. three or four times a day.

In enteritis, collapse and the loss of water are the added dan-

gers, and are to be contended against. In addition to the measures above given, camphor, 0.1-0.2, two or three times a day hypodermically, and later 0.05, three times a day, are injected. The loss of water is combated by Cantani's salt solution, 10 per cent., 125-150 c c., twice a day, at body heat. The temperature and cerebral symptoms are combated by the usual measures. In many cases it is difficult to decide when to resume the milk feedings, and most careful judgment is required at this point.

G. R. PISEK.

Barbier, M. H.: A Note on the Measure of the Utilization of Fats by Dyspeptic and Atrophic Infants. (*Annales de Médecine et Chirurgie Infantiles*, July 1, 1906, p. 444.)

The author points out the fact that it would be of the greatest value in the treatment of the various gastroenteric diseases—more particularly the chronic forms—if we had some means for a precise determination of the quantity and quality of food that the patient is able to digest and absorb. He is convinced by many observations that the milk ration as at present established for the average healthy infant is much too large; that the albumin constituent is two, and in some cases three, times what it should be. If this is true we have an explanation of a large majority of the digestive disturbances. If the normal infant is overfed this is even more true of the sick child, and we ought to determine if possible what the ration should be. Various experimenters have already determined that the healthy infant, if not overfed, will absorb about 96 per cent. of the fats if breast-fed, and about 94 per cent. if bottle-fed.

For purpose of comparison the author experimented upon two infants as follows:—

First, an athreptic six months' infant, weight 4k. 170.

Duration of experiment	4 days.
Fats ingested	47 gr. 40
Fresh stools	185
Dried stools	17.80
Fats in stools (gross weight)	6.41
Fats in stools (per cent. of stools)	36%

This indicates a loss of ingested fats of 14 per cent. in comparison with the normal 6 per cent.

A further examination showed that of this 6.41 weight of fats only 62 per cent. was in the form of soaps and fatty acids, while other experimenters have shown that the normal is 75 per cent. The author interprets this as an indication of a diminished activity of the bile and pancreatic juice.

The author draws the conclusion from the experiment that there is a diminution in the activity of the liver and of the pancreas and in the intestinal resorption.

The second experiment was similar to the one given.

In the discussion of this paper M. Variot emphatically contradicted the conclusions drawn by the author. He claimed that pediatricists in their fear of excess in feeding had gone to the other extreme, and that the amount set down in the tables for bottle feeding are entirely inadequate.

In the second place he (Variot) was profoundly convinced that atrophic or hypotrophic infants, except during acute attacks of digestive disturbance, ought to receive a larger ration than sound children of the same weight but not of the same age. Although it is true that these children on a regimen of forced feeding showed in their stools an excess of fats and other matters, nevertheless if the ration is reduced in order to obtain an increase in the proportional utilization the increase in weight is immediately checked.

L. C. AGER.

Parks, A. H.: Determination of the Normal Temperature of the Closed Inguinal Fold of a Child, and its Clinical Significance. (*The Journal of the American Medical Association*, September 29, 1906, p. 1,010.)

Parks has made a series of observations tending to clear up the mooted question, whether the temperature of a child's body should be taken in the internal cavities of the blood or externally, as in the axilla, etc. He says the practitioner is constantly looking to science and research for methods he may use in his routine work, and especially for those which combine accuracy and practicability. He gives a table which shows the result of former observations by several authors on children and adults. His own observations, 175 in number, were carried on in children only, from four months to five years of age. The author favors the

inguinal region for external observations rather than the axilla. The time element, which is an important one, was carefully worked out and recorded. It was found that the rectal method required three and one-half minutes for a complete register of the thermometer, while the inguinal method required six and three-quarter minutes.

Summary.—(a) The normal temperature of the closed inguinal fold of a child is 98.52° F. (37.5° C.).

(b) The variation of the inguinal temperature from the rectal temperature approximates one-third of a degree F., or two-fifths of a degree C., the average variation being $.34^{\circ}$ F. ($.18^{\circ}$ C.). That is, the inguinal temperature is approximately one-third of a degree F. (two-fifths C.) below rectal temperature.

(c) The usual variation between the temperature of the rectum and groin is so small as to be practically disregarded for clinical purposes.

(d) The absence of many objectionable features of the rectal method and the ease and reliability of the groin method gives the latter several points of advantage over the rectal method. These advantages of the groin method would recommend it not only as applicable in hospital practice in pediatrics, but more especially in home practice among children.

[It would seem necessary to verify these results in the sick as well as the normal child before adopting this method.]

G. R. PISEK.

Addenbrooke, Bertram: Scleroma Neonatorum in Twins.
(*British Medical Journal*, August 25, 1906, p. 428.)

A multipara was delivered of twins, a boy and a girl, at the eighth month. Both were strong and healthy but small. Two days later the feet of the girl became swollen, hard and waxy in appearance, pitting very little on deep pressure; the child was very somnolent and refused the breast; temperature, 97° F. On the same day the swelling spread up the legs and thighs to the middle of the abdomen, and by the next morning it involved the head and upper extremities. On this day the same condition began in the feet of the boy and gradually spread, the child being similarly drowsy. The girl died the same day and the boy three days later.

A. W. BINGHAM.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

APRIL, 1907.

[No. 4.]

Original Communications.

ON THE USE OF LIVING LACTIC ACID BACILLI TO COMBAT INTESTINAL FERMENTATION IN INFANCY.

BY CHARLES HUNTER DUNN, M.D.,

Assistant in Pediatrics, Harvard Medical School; Assistant Physician
at the Children's Hospital, and at the Infants' Hospital, Boston.

In the recent classification of the gastroenteric diseases of infancy and childhood adopted by the Department of Pediatrics of the Harvard Medical School, and presented in a paper* read by Dr. Rotch at the last meeting of the American Pediatric Society, a distinction was drawn between infectious diarrhea and intestinal indigestion of the fermentation type. This distinction was regarded as a necessity in improving the classification of these diseases, as much confusion has resulted from a failure to distinguish the essential etiologic difference between a process caused by a parasite infecting and living upon the tissues of the body, and a process caused by a saphrophyte living upon the intestinal contents. That such an etiologic difference exists is the only conclusion to be drawn from the total of bacteriologic research. It has been objected that this distinction is not a good one for practical purposes, because this etiologic distinction has no clinical parallel, inasmuch as the same tissue changes and clinical symptoms may be produced in the intestine either by the action of parasites in the intestinal wall or by irritation from and absorption of the products of saphrophytes causing fermentation in the intestinal contents. The objectors suggested that all processes caused by bacteria should be included under one head.

We were unwilling to accept this suggestion for a number of reasons. We believe that as the distinction suggested in our classification is a fact in etiology, its incorporation in a classifica-

* Rotch, Ladd and Dunn. ARCHIVES OF PEDIATRICS, December, 1906.

tion based on etiology is more advanced and scientific, more in accordance with recent progress, and affords a better foundation for further etiologic research. We admit that the same tissue changes may be produced in both forms of disease, but they may also be produced in other forms not caused by bacteria at all, for which reason we discarded tissue changes as a basis of classification, and the term ileocolitis as the name of a distinct disease. We believe, further, that this distinction is in most cases represented by a clinical parallel, and that a diagnosis between these two conditions can be made upon clinical grounds.

In an article on "The Etiology and Clinical Classification of the Summer Diarrheas in Infancy,"* I attempted to demonstrate this parallelism, and the means of diagnosing infectious diarrhea and fermental diarrhea respectively. The former is characterized by persistent fever, and the early appearance of the signs of ileocolitis, that is, mucus and blood in the discharges. The latter is characterized by the absence or brief duration of fever, and by the signs of excessive fermentation in the discharges, that is, a green color and foul odor, with signs of ileocolitis only after prolonged illness if at all. I also attempted to show that as far as our knowledge of the bacteriology of infectious diarrhea has gone, particularly in regard to the bacillus dysenteriae as a cause of intestinal disturbance, this clinical parallelism holds.

While working upon this subject, my attention was attracted by an article by Tissier on "The Treatment of Infantile Intestinal Infection,"† which suggested the possibility of a specific therapy for the fermental cases, which would make their sharp differentiation from the infectious cases all the more useful. The subject was approached by Tissier from the point of view of the organisms causing fermentation in the intestinal contents. While he does not draw a distinction between parasites in the tissues and saphrophytes in the food residue, he makes no mention of organisms found in the tissues, of tissue changes, or of agglutination in the blood, but does refer constantly to the chemical results of the fermentation of the intestinal contents. Moreover, the clinical type of case described by him is exactly that described in my article as fermental diarrhea, and in the more recent classification adopted by the Pediatric Department as intestinal indigestion with fermentation.

* Dunn. ARCHIVES OF PEDIATRICS, June, 1905.

† *Annales de l'Institut. Pasteur*, XIX., No. 5.

Tissier made careful studies of the intestinal flora in health and in this disease, establishing characteristic bacterial pictures for each, and identifying the various microorganisms. He found that in health the bacillus bifidus is the predominating organism of the dejecta in overwhelming predominance. In disease a bacterial transformation occurs, the bacillus bifidus disappears, and a number of abnormal forms appear. Tissier identified these organisms and studied them in detail, particularly their fermenting action on food elements and products. Among them he found only one variety which was pathogenic toward animals, and which attacked proteid substances and their derivatives. In doing this it forms a toxin, which has some necrotic power upon the tissues. This organism is the bacillus perfringens, a large rod with square ends, staining by Gram's method. In early stages it has a spore at one end; later no spores are seen. It is anaerobic, ferments sugar, and has the special peculiarity of causing a solution of meat or white of egg in sealed tubes.

Tissier believes this organism to be the cause of the class of cases which we know as fermental diarrhea. The products of the fermentation caused by other organisms he regards as having a possible contributive action through irritation of the mucosa. As predisposing causes, he believes that lack of digestive power and unsuitable chemical composition of the food play the chief rôles. The predominance of this disease in artificially fed infants may be attributed to the excess of proteid in cow's milk, causing more unutilized proteid to pass into the intestine.

He further noted that in recovery a very rapid change occurred in the bacterial content of the discharges. The abnormal forms disappear, and the bacillus bifidus reappears, at first in its bifurcated form, and quickly resumes its place as the preponderating microorganism.

He found that in culture media containing a sufficiency of carbohydrate the bacillus bifidus inhibits the growth of the bacillus perfringens, but that in media without carbohydrates the perfringens overcomes the bifidus.

Tissier concludes that the indications for treatment are to remove the fermenting intestinal contents by purgation and water diet, and to cause a reappearance of the normal intestinal flora. The latter object can be furthered by diminishing the proteid and increasing the carbohydrate in the food, and can be more specifically attained by introducing into the intestine an organism

tending to inhibit the growth of abnormal forms and to overcome them and cause their disappearance. In searching for a suitable organism for this latter purpose, he found that the bacillus bifidus and the lactic acid bacillus both stop the development of the perfringens, and he selected the latter, as it is more easily cultivated and handled. He uses this organism to effect a transformation of the intestinal flora.

In cases of fermental diarrhea, Tissier gives his patients pure cultures of the lactic acid bacillus, and under this treatment he notes a rapid transformation of the stools, subsidence of the symptoms and gain in weight.

This method of treatment struck me as being in the line of advance, as it is a specific treatment directed toward specific etiology, and based on scientific research. We are apt too long to neglect to apply in practice the knowledge given us from time to time by those engaged in scientific research. We have for a long time been accustomed to combating fermentation by purgatives, starvation, washing out the colon, and regulation of the feeding. Intestinal antiseptics have not proved of value. Yet although the fact that the growth of one organism inhibits that of another has long been known, it has not been applied in practice. It has never occurred to us to try to stop intestinal fermentation by introducing an inhibiting organism into the intestine—a procedure of very obvious possible value. This method of treatment as evolved by Tissier step by step to its logical conclusion proved very fascinating, and I determined to test it in practice.

Whether or not all Tissier's conclusions are justified does not affect the main issue. These processes may or may not be caused by the bacillus perfringens or by other organisms. We do believe them to be caused by bacterial fermentation, and we are justified in introducing into the intestine any harmless organism that affords a hope of inhibiting the abnormal processes. The lactic acid bacillus is harmless. Tissier has shown that it inhibits the bacillus perfringens in the test tube, and gives evidence that it effects a transformation of the flora in the intestine. Bienstock* has shown that it prevents the putrefying action of the bacillus putrificus. Therefore it at least holds forth a prospect of good results.

It then occurred to me that buttermilk is made with lactic acid bacilli, and that an unpasteurized buttermilk should contain large

* *Annales de l'Institut. Pasteur*, XIII., November, 1899.

numbers of this organism. Buttermilk has been widely advocated and employed in infant feeding, but, as far as I know, never on account of its bacterial content. It has been employed for chemical reasons, because its chemical composition was believed to be adapted to certain abnormalities of digestion and metabolism. In Europe it is invariably cooked before being given to infants, and in this country, as far as I know, has always been carefully sterilized or pasteurized. Consequently, none of the literature on buttermilk is of value as bearing on the question of the action of lactic acid bacilli in fermental diarrhea. Wurtz* recommends it in cases of proteid and fat intolerance. Von Rommel† believes its acidity to be the active principle of its favorable action. Decherf‡ believes it to be of wide value in gastroenteritis and rachitis, and prepares it by boiling with cane sugar. And there are many other recent articles on the great value of buttermilk as an infant food, usually in cases of chronic indigestion or atrophy. Others have not obtained such favorable results. It has been given a thorough trial, in a pasteurized form, here in Boston, without notable favorable results. I believe that its favorable action is dependent on the proteid or fat intolerance so commonly observed, and have never seen a case which did well on pasteurized buttermilk which did not also do well on proper milk modification.

I selected buttermilk as a convenient vehicle for giving lactic acid bacilli, in the first place, because it seemed to me that in that way, by combining medicine and food, I could introduce larger numbers of the organism than if I used small doses of bouillon cultures in addition to the food. In the second place, I wished to use a constant food in all my cases, and selected buttermilk as being a digestible food, not liable to produce accidental upsets from proteid or fat intolerance.

The buttermilk employed was made by H. P. Hood & Sons. The milk is first pasteurized, then inoculated with a pure culture of lactic acid bacilli, and ripened until the development of the organism has brought about the proper acidity and precipitation of the casein. The particular strain of lactic bacilli employed was isolated by Mr. S. C. Keith, bacteriologist with H. P. Hood & Sons, who selected it on account of the delicate aroma it produces. It is

* *Mediz. Klinik.*, 1905.

† *Therap. der Gegenwart*, June, 1905.

‡ *Archiv. de Méd. des Enf.*, January, 1905.

possible that different strains may have different effects in the intestine.

I was unable to carry on proper bacteriologic investigations of the stools, confining myself to the study of the clinical results.

These results have proved exceedingly striking. The unpasteurized buttermilk has been tried on 35 selected cases. Of these there was evidence of a favorable result, as shown by a change in the character of the dejecta and by gain in weight, in 23. In 3 there was immediate cessation of diarrhea and favorable change in the character of the dejecta, without gain in weight. In 9 cases the lactic acid bacilli produced no effect.

In the majority of the cases the buttermilk was begun only after all ordinary and routine measures had failed. In the treatment of this disease there are always a certain number of cases which prove refractory, and which resist the employment of all the resources at our disposal. I endeavored, as far as possible, to select such cases for experiment with living lactic acid bacilli.

The routine treatment employed in cases of fermental diarrhea is the following: The child is first given castor-oil or calomel to empty the bowel, and nothing but boiled water is given for a period of twenty-four hours. Only barley water is given for a second twenty-four hours, and then feeding with a weak milk modification, usually fat 2, sugar 5, proteid .25, is begun. If there is no return of symptoms the strength of the milk is gradually increased, beginning with an increase in the percentage of whey proteid only, such as fat 2, sugar 5, whey proteid .90, caseinogen .25. Later the other elements are increased until a satisfactory gain in weight is maintained. If, however, the resumption of milk feeding is followed by a return of the symptoms, and further loss of weight, the same process is repeated, milk being this time withheld longer, at least seventy-two hours. Bismuth and irrigation of the colon are also tried, and milk feeding is finally resumed in the form of whey, to be gradually strengthened. If after this treatment the symptoms do not improve after a reasonable time, the strength of the milk is increased, as I have found that by so doing a certain number of cases will gain weight in spite of the persistence of the symptoms of fermentation. If this fails the case comes into the category of obstinate and resistant cases, and is usually treated by alternating in turn the percentages of the various elements, by cereal diluents, by peptonizing, or by resorting to

a wet nurse. It was such resistant cases which were selected for the experiment with living lactic acid bacilli. The immediate improvement, alteration in movements, and gain in weight seen in so large a number of such cases were consequently all the more striking.

Not all of the 35 cases were of the fermental type. Five cases were diagnosed as of the irritative type of disease, and these cases were selected for trial only because they proved resistant to the routine treatment, or because the condition of the child was so serious as to warrant trying whatever held out any promise of doing good. As the two types run into one another, the element of fermentation often being found in cases of the irritative type, I hoped that, in view of the remarkable results which I was obtaining in the frankly fermental cases, I might be able to do good in these resistant irritative forms. This hope was disappointed. Every one of the 5 cases of the irritative type in which the buttermilk was used is numbered among the failures. This result was all the more significant in contrast with the similarly resistant fermental cases, and is evidence in favor of the specificity of this method of treatment.

Two of the cases in the series were of the infectious type, probably of dysenteric origin, characterized by persistent fever and bloody-mucous stools. In both of them, also, the unpasteurized buttermilk failed to bring about any notable change.

Thus only 2 of the cases of total failure were frankly of the fermental type of disease, the type described by Tissier. Consequently, if the fermental cases alone be considered, the figures are as follows:—

Treatment successful.....	23 cases.
Treatment partly successful.....	3 “
Treatment failed.....	2 “

In order to be able to justify the conclusion that these favorable results were due to the action of the living lactic acid bacilli, it was necessary to obtain evidence that they were not due to the chemical qualities of the buttermilk as a food. Such evidence is particularly necessary in view of the many reports of the favorable action of buttermilk referred to above. To investigate this, in 14 resistant cases of the fermental type the buttermilk was first given in a pasteurized form, and after a sufficient trial had demonstrated a failure to improve, the pasteurization was simply

omitted, no other change being made. In every one of the cases the omitting of the pasteurization was followed by immediate improvement.

Another interesting experiment was tried. I endeavored to ascertain if the mere giving of the lactic acid bacilli in fermental cases would cause rapid cessation of the symptoms without other treatment. In 4 cases suffering from acute diarrhea and fermental movements, no castor-oil nor calomel, no bismuth nor irrigations, and no period of starvation were employed, the only treatment being the administration of unpasteurized buttermilk. Two of these cases were successful, and are among the most striking in the series (Cases 24 and 26). In 1 case the movements improved, but the child did not gain weight. The 4th case was a failure.

Some of the individual cases in the series presented striking points of interest. There were cases in which the use of the unpasteurized buttermilk was followed by immediate improvement in the symptoms and discharges, but in which a gain in weight did not follow. When, however, the buttermilk feeding was supplemented by alternate feedings of modified milk, steady gain in weight began at once. (See Case 21.) This case suggested that although the lactic acid bacilli had stopped the fermentation, the buttermilk was not adapted to the caloric needs of the child. When the buttermilk was supplemented with food of higher caloric value, the child gained weight. The lactic acid bacilli having prepared the way by causing a cessation of fermentation, the patient was able to thrive on a formula which in the first place it could not digest. In similar cases, the buttermilk was only continued until the alteration in the movements had occurred, and then the child was put back on the same food on which it had done badly before the use of the buttermilk. In such cases, after the buttermilk had been used, the patient gained weight. (See Case 26.)

The fact that buttermilk as a food is not always adapted to the caloric needs of individual infants suggested the possibility of another method of employing living lactic acid bacilli in the treatment of this class of cases. A certain amount of fat in the food may be necessary for a particular infant, on account of the high caloric value of this food element, and the existence of fermental diarrhea does not imply the existence of fat intolerance. If it is possible to grow lactic acid bacilli in buttermilk, it is also possible

to grow them in other percentage modifications. We can thus combine the two indications for treatment by giving a food suited to the nutritive requirements of the infant and by stopping fermentation. We can thus combine the resource of living lactic acid bacilli with the wide range of resources afforded by percentage feeding by ordering the various mixtures which we believe adapted to the need of individual cases, to be ripened with lactic acid bacilli.

With this end in view, I arranged with the Walker-Gordon Laboratory, that upon order they would inoculate and ripen any percentage formula with lactic acid bacilli. Under this arrangement the physician only has to select the formula which he believes to be most favorable for the individual case, and write a prescription to the laboratory, as, for example: R. Fat 2. Sugar 5. Whey proteid .90. Caseinogen .25. Lime-water 5. Ripened with lactic acid bacilli. This arrangement was perfected too late in the season for trial, except in 2 cases (Cases 22 and 23).

Some of the cases of failure in irritative diarrhea presented points of interest, in that the patients subsequently did well when the particular percentage formula adapted to the requirements of the particular child was found. (See Cases 27 and 28.) They illustrate the importance of an accurate diagnosis of the etiology of the condition. Also the success of the treatment with lactic acid bacilli in fermental cases, and its failure in both irritative and infectious cases is an additional argument in favor of drawing the sharp distinctions based on etiology referred to at the beginning of this article. It suggests that not only is there a correspondence between etiologic forms and clinical pictures, but also a correspondence between etiologic forms and therapeutic measures. The mere suggestion of such a possible correspondence is of promise for the future.

It is my purpose next summer to continue this investigation. I hope to make a thorough trial of the effect of various percentage formulæ with and without inoculation and ripening with lactic acid bacilli. I intend to try the effect of giving the organism in the form of bouillon cultures after the manner of Tissier. I hope also to be able to make parallel investigations of the bacteriology of the dejecta under this form of treatment. Moro* has

* Moro. *Munch. Med. Woch.*, LIII., No. 41, 1906.

recently published an article on *Natürliche Darm-Desinfektion*, in which he reports on the use of this same procedure. He found that it was necessary to use large quantities of bouillon culture by mouth, and thinks the results are better when the organism is introduced into the rectum. This may also be tried.

I am not publishing these results at this time because I believe that they are in any way conclusive, or prove the value of lactic acid bacilli against all cases of intestinal fermentation. The number of cases is too small, and conclusions drawn from the statistics of therapeutic experiments are more often erroneous than correct. The only conclusion which I believe may safely be drawn is, that the use of living lactic acid bacilli is a harmless method of treatment, and that it may do good in cases of intestinal fermentation. I report these cases in the hope that others may take up this idea of treatment, and that additional experience will either prove or disprove its value.

Its value lies chiefly in the fact that it is an additional resource, applicable in a very difficult class of cases. Although we have accomplished great things in the treatment of these conditions by proper feeding methods, and although the resources provided by the wide limits of percentage feeding are very numerous, nevertheless a certain number of cases remain over which defy all our resources and resist our best therapeutic endeavors. As long as we have such resistant cases, we have need of every possible resource, and any new resource can never be superfluous. I believe that the use of living lactic acid bacilli to combat fermentation is a resource which has a logical scientific foundation, and which in time may take a high place in the scale of efficiency.

CASE I., eleven months old, was brought to the Out-Patient Department when three weeks old for regulation of feeding, reporting from time to time since then. The diet recently has been whole milk and oatmeal jelly.

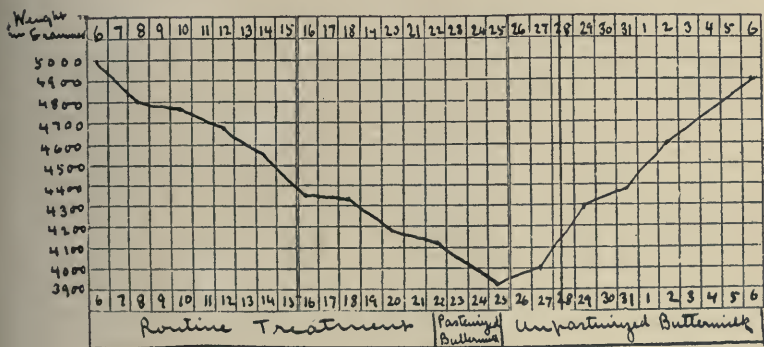
On August 6, 1905, the baby was brought in, having been sick for one day with diarrhea. She had had seven movements in the last twenty-four hours, and had passed gas with a little greenish fluid at other times, and had vomited all food. She had seemed very sick, with much crying. Appetite fairly good. No fever had been noted.

On examination, the temperature was found to be 98° F., and the child looked apathetic and toxic, though well nourished.

There was strabismus and twitching of the extremities at times. The fontanel was depressed and the extremities were cold.

The movement shown was watery, dark green, somewhat frothy, and of a foul odor, without curds, mucus or blood.

The treatment ordered was two teaspoonfuls of castor-oil at once, brandy every four hours, and a boiled water diet for twenty-four hours. During the second twenty-four hours barley water was given. During this time the movements diminished in frequency, but remained loose, foul, and frothy. On August 8th milk feeding was resumed, and the movements increased in frequency, remaining of the same character. Loss of weight continued. Milk of bismuth was then ordered in doses of one tea-



spoonful every four hours, one teaspoonful of castor-oil was given, and a period of forty-eight hours complete starvation was tried. Again the movements diminished in frequency, increased somewhat in consistency, but remained very foul. Feeding with whey was then tried, on which the patient had from three to five foul, loose, greenish-black movements a day, with considerable mucus, and the loss of weight was constant. The toxic appearance varied, but never wholly disappeared. An attempt was then made to attain a gain in weight by increasing the caloric value of the food. First, fat 1, sugar 5, whey proteid .90, caseinogen .25 was tried, which was increased a little each day till fat 3, sugar 7, whey proteid .90, caseinogen .25 was reached. During this time there was but little change in the character of the movements or in the general appearance of the child. Loss of weight continued, and the movements remained foul, greenish-black and full of mucus. Irrigation of the colon was also tried with no appreciable result.

On August 22d feeding with buttermilk was begun, and it was ordered to be pasteurized before use. There was some change in the character of the movements, which became a little firmer in consistency, but remained of bad odor and color, with much mucus. Loss of weight continued.

On August 25th the pasteurization of the buttermilk was ordered omitted. From this time on there was a rapid and persistent gain in weight, and by September 6th the baby had gained 1,000 grams. The movements became almost solid, frequently formed, light yellow in color, well digested, with a sour rather than a foul odor, and the mucus gradually disappeared.

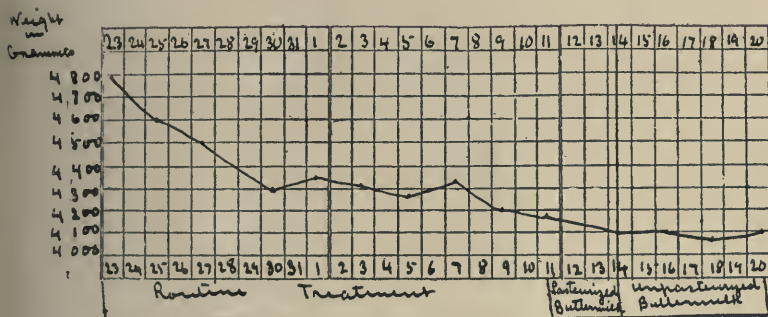
CASES II. to VIII. were similar to the above in their main features. All were cases of acute diarrhea, without fever, of a



prolonged course, with movements showing the fermental characteristics, and with steady loss of weight. In all, the usual resources of treatment were exhausted without avail before the buttermilk was tried. The buttermilk was first given pasteurized, without any effect upon the weight curve. Then, after omitting the pasteurization, there was always some gain on the second day, which persisted, with occasional slight temporary relapses. In all there was a marked change in the appearance of the movements, which became of firm consistency, light yellow or light green, and of a slightly sour odor.

CASES IX., X. and XI. were similar to the above, except that the gain in weight did not follow so immediately upon the administration of the buttermilk.

CASE XII., four months old, came to the Out-Patient Department on August 23, 1905. He had been constantly failing since birth. The diagnosis was chronic intestinal indigestion. The movements showed evidences of fermentation, being green and foul, not loose. There was no fever. The usual resources failed to produce any improvement. Under pasteurized buttermilk there was loss of weight and but little change in the character of the movements, except the appearance of numerous fine curds. Pasteurization was omitted on September 14th. There was an immediate change in the character of the movements, which became yellowish, putty-like and sour. No gain in weight was noted. I wished to try alternate feeding of buttermilk and a fairly strong modification, but the patient ceased to come to the hospital.



CASE XIII. was similar to Case XII., the giving of unpasteurized buttermilk being followed by improvement in the movements, but no gain in weight.

CASES XIV.-XX. were all successful cases, differing from Cases I.-XI. only in that the buttermilk was not first pasteurized, but the unpasteurized buttermilk was tried in the first place. All were cases of the fermentation type, without fever, in which the routine resources of feeding and treatment were first exhausted without either improvement of the symptoms or gain in weight. In all of them the use of the buttermilk was followed by gain in weight.

CASE XIV., seven months old, had always been subject to more or less chronic indigestion, but had gained weight on a mixture of equal parts milk and water, with some sugar.

On July 23d the child was brought to the Out-Patient Depart-

ment with an acute attack of diarrhea and vomiting. After the routine treatment with calomel and water diet, the patient was put on Walker-Gordon Laboratory milk—formula: fat 2, sugar 5, whey proteid .25, caseinogen .25. There was rapid improvement. On August 16th the formula was changed to fat 2.50, sugar 5.50, whey proteid .90, caseinogen .25. On August 22d it was made fat 3, sugar 6, whey proteid .90, caseinogen .50. On September 13th it was again increased to fat 3.50, sugar 6.50, whey proteid .75, caseinogen .75, and on September 19th was made fat 4, sugar 7, whey proteid 1.

On September 26th the baby was taken off the laboratory milk and put on the Whiting modified milk, fat 3, sugar 6, proteid 1, as the laboratory milk was no longer available.

On September 28th the child was brought in with a severe acute diarrhea of twenty-four hours' duration. It had had twelve movements in twenty-four hours, and had vomited everything taken.

On physical examination the temperature was found normal. The baby was very drowsy and apathetic, with a sunken hollow look about the eyes. Otherwise, nothing abnormal.

The movement shown was very loose, greenish-yellow, and of a very bad odor.

The treatment was calomel, gr. $\frac{1}{10}$ every half hour for ten doses, brandy every four hours, and boiled water only. On September 29th the child was very weak and had had three small green movements. Vomiting had ceased. Barley water was ordered.

On September 30th there was no notable change. Loss of weight had been rapid. Fat 2, sugar 5, proteid .25 was ordered. On October 2d the child was admitted to the hospital, on account of extreme weakness and prostration. It looked very badly, with depressed fontanel, cold extremities, and the characteristic abdominal expression seen in severe cases of this type. The temperature was 98° F. On admission, one teaspoonful of castor-oil was given, and boiled water for twenty-four hours. Milk of bismuth was given every four hours in teaspoonful doses, and brandy was ordered. Then whey was tried, without any improvement. The movements numbered three to six in twenty-four hours, and were green and foul, sometimes with curds and mucus.

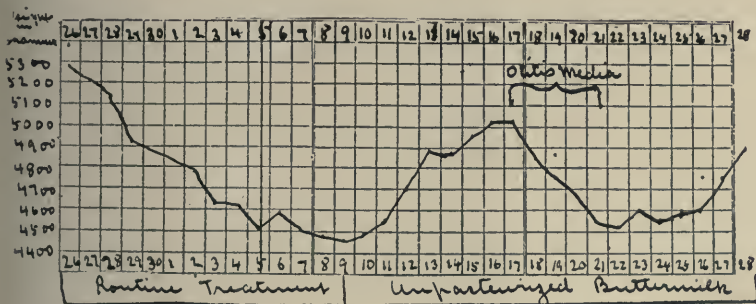
On October 7th fat 3, sugar 7, whey proteid .90, caseinogen

.25 was tried with no other effect than an increase in the number of foul movements.

On October 9th feeding with unpasteurized buttermilk, 7 ounces every three hours, was begun. It was vomited occasionally for the first forty-eight hours, but after that was taken very well. On the day the buttermilk was begun the weight was 4,470 grams.

On October 10th there was a complete change in the appearance of the child. The toxic apathetic look had gone, and she seemed brighter and to take an interest in her surroundings. The movements were still green, but of firmer consistency, with some mucus and curds, and sour rather than foul. Weight 4,490 grams.

On October 11th the movements were six in twenty-four hours, solid, green or greenish-yellow, with some mucus. Weight 4,560 grams.



On October 12th-17th the movements were three to five in twenty-four hours, yellow, smooth and pasty. The weight continued to rise, being 5,030 grams on October 17th.

On October 18th there was a rise in temperature and pulse. There was no change in the movements. The weight had fallen to 4,870 grams.

October 19th-21st the rise in temperature continued, reaching 104° F. on October 20th, and 106° F. on October 21st, with a pulse of 180 and respirations of 70. On this day an acute otitis media was found, and paracentesis performed. In the afternoon the temperature fell to 101° F., pulse 140, respirations 35, and the child seemed much better. During the attack there was no notable change in the character of the movements, but the weight fell to 4,550 grams on October 21st and 4,520 grams on October 22d.

On October 23d the temperature was normal, and the weight

had jumped up to 4,600 grams. After this, there was a slower gain, till the patient was discharged well on October 28th, with a weight of 4,860 grams.

CASE XIX.—Six months old. Colored. Came to the Out-Patient Department on August 14, 1906. Had been fed on con-



densed milk, 2 drams; boiled water, 8 ounces; lime-water, 1 dram, every two hours. Had had diarrhea for a week, twelve to fourteen movements a day, and occasional vomiting. The mother stated that he was feverish on the first day of the diarrhea, but has not been so since.

The movement shown was green, loose, foul, with mucus, and without curds.

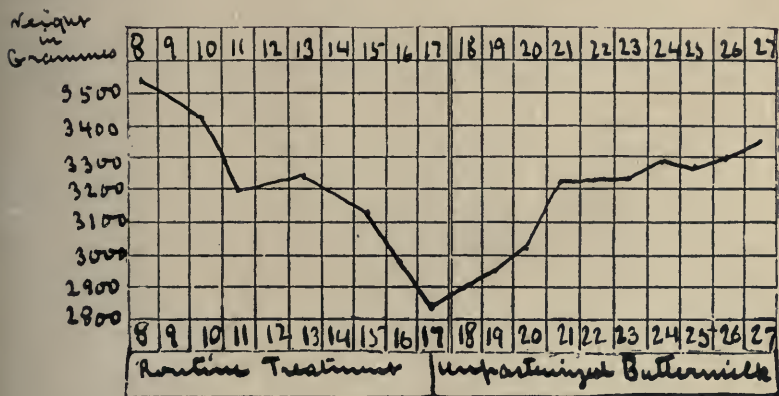
He was treated by the usual methods from August 4th to August 14th. Purgation, starvation, bismuth, and irrigation of the colon were tried. Weak modifications, barley water and whey were used. There was no improvement, and the weight fell from 4,680 grams to 4,160 grams.

On August 14th feeding with unpasteurized buttermilk was begun. It was not taken very well, and was occasionally vomited.

On August 16th the mother stated that the diarrhea had ceased, there having been but two movements in the past twenty-four hours. The movement shown was mixed yellow and green, not loose, very undigested, with considerable mucus and a sour odor. The weight was 4,460 grams.

The patient did not return, but the mother writes me that he

continued to do well, and that she continued the buttermilk for three months.



CASE XXI., four months old, was admitted to the hospital on October 16, 1906. It had been fed on malted milk.

One week previously it became very fussy, irritable, and began to have diarrhea, fourteen or fifteen loose movements a day. Three days ago the head was somewhat retracted, and there was crying on handling. The mother said that several times in the past week the baby had had "sinking spells," lasting from one to three hours, in which the child was motionless, cold, with open mouth. There was no twitching. It seemed much exhausted after these attacks.

On physical examination the child was found poorly nourished, pale, and the face had a pronounced "abdominal" expression. The fontanel was depressed, and the cry was very feeble. The respiration was slightly accelerated, and there were a few moist râles scattered through the lungs. There was no tenderness of the abdomen, nor retraction of the head. The temperature was normal at entrance, and remained so, with the exception of a few slight rises.

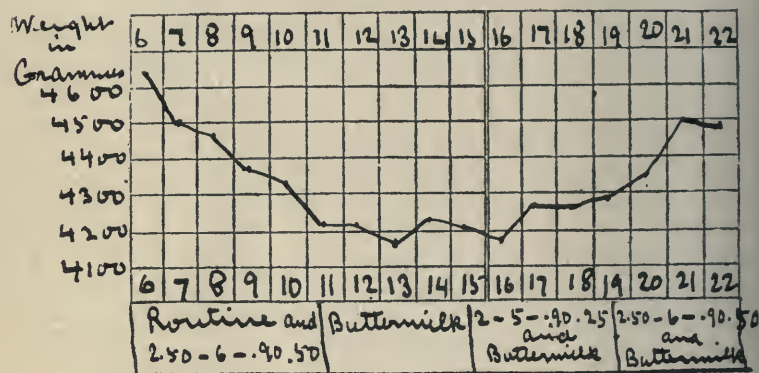
It was treated with castor-oil, starvation, barley water, whey, and weak modified milk. During this time it had daily four to seven watery, brownish or greenish movements, with a foul or sour odor. There were no curds nor mucus. Loss of weight was constant.

On October 11th unpasteurized buttermilk was begun. There was an immediate change in the character of the movements,

which became formed, smooth, brown, occasionally slightly green, with but little odor. The general condition improved greatly, but there was no gain in weight.

From October 15th to October 22d buttermilk feedings were alternated with feedings of ordinary modified milk, the formula being the same as had been unsuccessfully tried before the buttermilk was used, namely, fat 2, sugar 5, whey proteid .90, caseinogen .25. The movements changed from brown to yellow, were pasty in consistency, occasionally were slightly greenish and occasionally contained curds. There were three to six in twenty-four hours. The child began to gain weight very slightly.

The strength of the modified milk was then increased, the



buttermilk feedings being continued, and the gain in weight became more rapid.

The above case illustrates that, whereas the lactic acid bacilli may affect a change in the character of the movements, the buttermilk may in its caloric value or digestive suitability be unfitted to the needs of the child.

CASE XXII., three months old, was admitted to the hospital on October 12, 1906, for regulation of feeding. It was a small, emaciated baby, with an expression suggesting pain, and legs rigidly drawn up. Temperature 97° F. The case was found to be one of chronic intestinal indigestion. From October 12th to October 21st, in spite of all efforts, there was practically no gain. The movements were undigested, and sometimes green and of a bad odor.

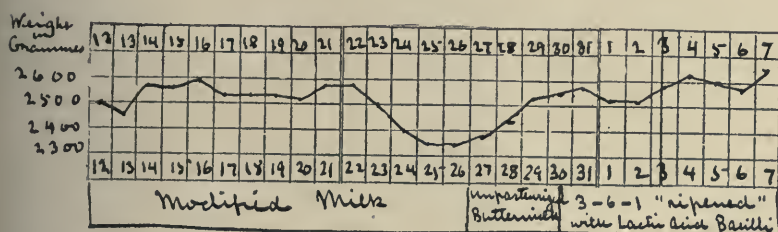
From October 21st to October 27th the movements were

looser, yellow or green, with a foul or sour odor, and frequently contained curds and mucus.

On October 27th unpasteurized buttermilk was begun, with immediate change in the character of the movements, which became less frequent, of firmer consistency, yellow, of a normal or slightly sour odor, occasionally containing small curds or undigested masses. There was a moderate gain in weight.

On October 30th the buttermilk was stopped, and the feeding changed to fat 3, sugar 6, proteid 1, "ripened" for twelve hours with a pure culture of lactic acid bacilli. From this time until the patient was discharged, on November 7th, the moderate gain continued. The movements numbered one to three in twenty-four hours, and were formed or pasty, yellow, without curds, and with a slightly sour odor.

In the above case, although there was no increased gain in



weight after the change from buttermilk to modified milk, ripened with lactic acid bacilli, the favorable change and moderate gain which took place with buttermilk continued with the inoculated modified milk.

CASE XXIII. was very similar to the above.

CASE XXIV., two months old, was brought to the Out-Patient Department on September 15, 1906, having had twelve movements in the past forty-eight hours, and much vomiting. Examination showed a very small baby, much emaciated, with depressed fontanel, feeble cry, and cold extremities. Weight 2,020 grams. Temperature 97° F.

Movements were very watery, green, foul, frothy, with mucus.

Unpasteurized buttermilk was begun at once, without purgation, starvation, or any other treatment.

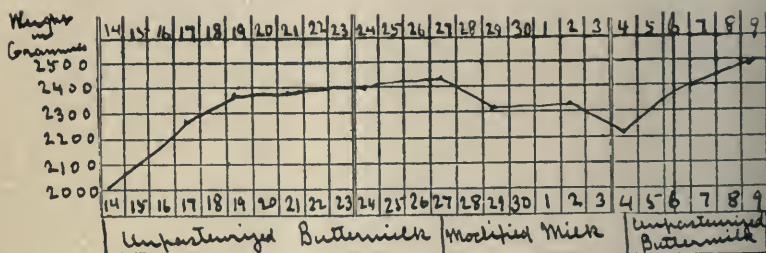
On September 17th the baby was again brought in. The mother said that vomiting ceased at once, and the child became

much brighter and more vigorous. The movement shown was not loose, was smooth, and clay-colored. Weight 2,280 grams. Temperature normal.

On September 21st the movements were still rather frequent, six in twenty-four hours, but were not loose, and light yellowish green. Weight 2,390 grams.

September 21st-September 27th the movements became less numerous, light yellow, and well digested. The weight increased to 2,420 grams.

On September 27th, as the gain in weight was so slight, the buttermilk was omitted entirely, and Walker-Gordon Laboratory milk ordered, formula, fat 2, sugar 5, whey proteid .25, caseinogen .25. This was increased on September 29th and again on October 2d to fat 3, sugar 6, whey proteid .90, caseinogen .25.



On October 4th diarrhea was reported, of two days' duration. There were eight to ten movements a day, loose, green, and of a bad odor. The weight had dropped to 2,220 grams. Modified milk was omitted, and buttermilk feeding resumed.

October 6th the mother stated that the movements had improved at once. There had been four in the last twenty-four hours, bright yellow, loose, not foul. Weight 2,370 grams.

October 9th the movements were smooth, not loose, yellow, two in twenty-four hours. Weight 2,500 grams.

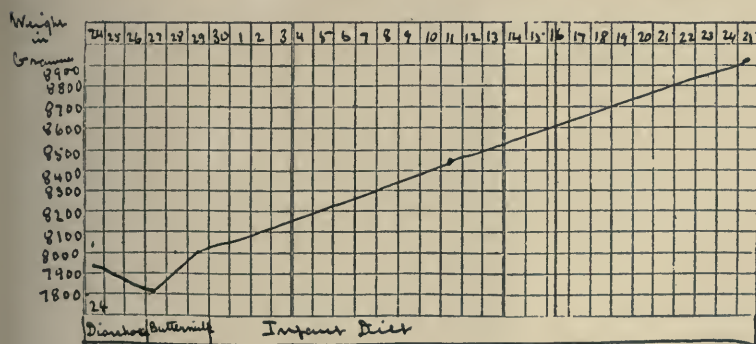
October 10th-29th the baby continued to gain on the buttermilk.

This case illustrates the possible effect of living lactic acid bacilli on fermental diarrhea, no other treatment being employed. It is true that the element of fat intolerance cannot be excluded here, as when the buttermilk was omitted and the fat increased the diarrhea returned. But even if fat indigestion is the primary cause, nevertheless the diarrhea assumed the fermentation type,

and so rapid a cessation of fermentation and alteration in the character of the movements followed the giving of the buttermilk, without other treatment, that I think its good effect cannot wholly be attributed to the fact of its low fat content, but must also be attributed to the action of the living lactic acid bacilli. It is unfortunate that the patient was not tried on a fat free milk without lactic acid bacilli, or on pasteurized buttermilk, to settle this point. The case further illustrates that a relapse may follow too early omitting of the buttermilk and resumption of milk feeding. In other cases, the buttermilk must be supplemented or replaced by modified milk to attain a satisfactory gain in weight.

CASE XXV.—In this case, buttermilk was the only means of treatment. As soon as the child began to take it, the diarrhea ceased with great suddenness, and the movements became normal. The weight curve could not be satisfactorily followed.

CASE XXVI.—In this case, also, the unpasteurized buttermilk



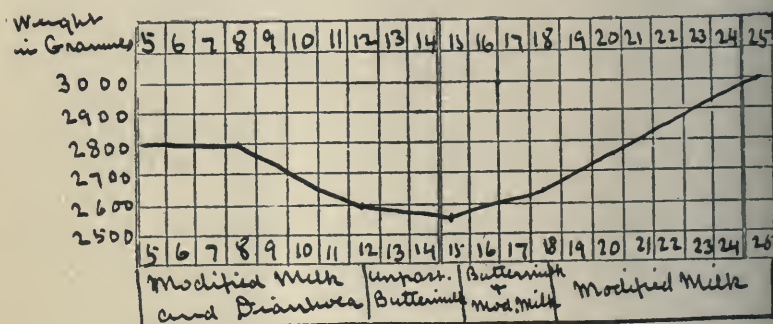
was the only means of treatment. The child was brought in on August 27, 1906, with an attack of diarrhea of one day's duration. There were very frequent, loose, green, foul movements, without curds or mucus. There was no fever. The weight was 7,820 grams, the last recorded weight, on August 24th, having been 7,910 grams. As soon as the buttermilk was begun the diarrhea ceased, the movements improved, and became normal in two days. There was gain in weight. The child was then put back on the original diet of whole milk, barley jelly, and zwieback, with a continued gain in weight.

This case illustrates the use of unpasteurized buttermilk as a pure medicine, for the purpose of effecting a "transformation of the stools" (Tissier) by means of its lactic acid bacilli. There

was no continued use of buttermilk as a food, as it was given for forty-eight hours only, during which time the diarrhea ceased. Then the child continued to gain on its normal diet.

CASES XXVII.-XXXV. were all cases of failure. Only 2 of them were cases of obvious fermental diarrhea, analogous clinically to the cases in which a successful result was obtained. Two were cases of infectious diarrhea, in which no good result was expected, but in which the lactic bacilli were tried as an experiment. The remaining 5 were cases in which other factors than fermentation were the controlling factors in producing the diarrhea.

CASE XXVII., two months old, was seen September 5, 1906. Was breast-fed until August 29th, since which time she was fed



on barley-water only. Chief complaint, weakness and vomiting.

Examination showed a very small, thin, weak baby. The temperature was normal. Weight 2,800 grams.

The movements shown were not very loose, green, nor foul, without curds or mucus.

The child was treated by the usual methods of purgation and starvation, and was started on fat 2, sugar 5, whey proteid .90, caseinogen .25. September 8th-September 12th the movements were five to eight daily, loose, and yellow or green, not foul, full of curds or undigested fat. The weight fell to 2,600 grams.

On September 12th unpasteurized buttermilk was begun.

On September 15th it was reported that there was no improvement, and that the movements were more frequent, very loose, not foul, full of curds. Weight 2,590 grams. Alternate feedings of buttermilk and modified milk were ordered, the same formula, 2—5—.90—.25, being used.

September 18th the patient's condition was about the same. Movements better digested, but still contained curds. The buttermilk was omitted, and the formula changed to fat 2.50, sugar 5, whey proteid .90, caseinogen .25.

On September 25th the child was doing splendidly. The movements had gradually become normal, and the weight was 3,060 grams, a gain of a pound in one week.

The above was a case of intestinal indigestion of the irritation type, and the presence of curds in the movements suggested intolerance of caseinogen. The buttermilk was tried on account of the very serious condition of the child on September 12th, in the hope that there might be some element of fermentation. It had no good results, and later the child did well on a food of low caseinogen content. Although the child digested a food after the use of the buttermilk which had caused indigestion before, there is no reason for believing that the lactic acid bacilli were of any assistance. It is probable that with care and patience, by weakening the food still more for a time, a similar result could have been obtained.

CASE XXVIII., five months old, was a regular patient of the Out-Patient Department, where it had been treated by means of all our resources since August 14th. A great variety of formulæ were tried with no result, and with a gradual loss of weight. No formula was weaker than fat 2, sugar 5, whey proteid .90, caseinogen .25. The movements were at times very frequent, greenish-yellow, with much undigested curd or fat.

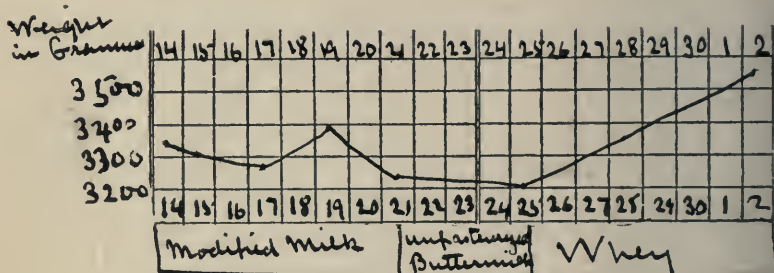
Unpasteurized buttermilk was begun on September 21st, the weight being 3,260 grams, and continued till September 25th, when the weight was 3,230 grams. During this time the movements were rather more frequent, light yellow in color, undigested, with many curds.

The case was now perceived to be of the irritation type, and I supposed it might be a case of fat intolerance, or possibly of intolerance of even so small an amount of caseinogen as .25 per cent. I considered the first most probable. Accordingly, the feeding was changed to whey.

On September 28th the mother said the baby was much better. There had been five greyish movements in the last twenty-four hours, without curds or undigested masses. The weight showed a gain to 3,370 grams.

On October 2d the baby was perfectly well, and gaining rap-

idly on whey alone. I then tried to determine the respective limits of fat and proteid tolerance, and increased each in turn very gradually. I found that at first the caseinogen could only be increased to .20 per cent., above which point the movements became undigested, but the fat could easily be increased to 3 per cent. The diagnosis was therefore intolerance of caseinogen. Later the power of digesting caseinogen improved. On November 6th the baby was digesting fat 3, sugar 7, whey proteid .90, caseinogen .60, and weighed 3,890 grams.



This case illustrates the necessity of drawing a careful distinction between the fermental cases, in which the lactic acid bacilli seem of value, and the irritative cases, in which the trouble often comes from intolerance of some particular food element.

CASES XXIX., XXX. and XXXI. were of a similar nature. Cases XXIX. and XXX. did not remain under observation long enough to determine the exact cause of the indigestion. Case XXXI. was one of fat intolerance, which did well on whey, on fat free milk, and on fat 1, sugar 7, proteid 2.

CASE XXXII., six months old, was seen on July 30, 1906. Four weeks previously he began to have diarrhea alternating with constipation, at times four or five movements a day, green, loose, with curds at first, but not now.

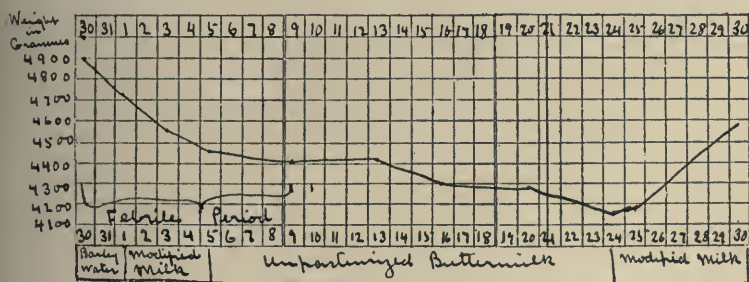
For the last three days he has been feverish, and has seemed very sick. The movements have been full of mucus, dark green in color, and show specks of blood. They have no odor. There have been five in the last twenty-four hours.

On physical examination the child was found very weak and apathetic, taking no notice of his surroundings. The skin was hot and dry. The abdomen was much depressed. The temperature was 104° F., and the weight 4,900 grams.

The treatment was castor-oil, one teaspoonful, and boiled water only for twenty-four hours. Irrigations of the colon were ordered twice a day. Barley-water was given for the second twenty-four hours, and brandy was ordered every four hours.

On August 1st the child was worse in general condition. It was unconscious, with cold extremities, and looked moribund. The temperature was 101.8° F., and the weight 4,720 grams. The movements consisted wholly of mucus, streaked with blood. No change in the treatment was ordered, except the beginning of milk feeding, with fat 2, sugar 5, proteid .25.

On August 3d the child was much better, conscious, and seemed much stronger. The temperature was 100.2° F., and the weight 4,590 grams. There were no movements, except with the



irrigation, when considerable brownish mucus came away. No blood.

On August 5th the improvement had continued. There had been one movement in twenty-four hours, containing considerable fecal matter. The temperature was 100° F., the weight 4,480 grams.

Unpasteurized buttermilk was now tried, to see if it would produce a gain in weight. It was continued until August 24th, during which time the movements gradually became more fecal and pasty and yellow. The temperature remained slightly elevated until August 10th. The weight gradually fell to 4,190 grams.

On August 24th modified milk feeding was resumed, beginning with fat 2, sugar 5, whey proteid .25, caseinogen .25. This was rapidly increased to a strong mixture. The weight rose rather rapidly, reaching 4,560 grams on August 30th, and 4,760 grams on September 8th.

This case suggests that unpasteurized buttermilk will not produce a gain in weight in infectious cases. Case XXXIII. was an infectious case, in which the buttermilk was likewise ineffective.

CASE XXXIV., eight weeks old, came to the Out-Patient Department on October 13, 1906, with diarrhea of one month's duration. The movements numbered five to six daily, were watery, green, foul, with few curds and some mucus. Vomiting was notable, and there had been loss of weight. The child had frequent "fainting spells," lasting about ten minutes.

It was treated in the Out-Patient Department without improvement, although all the usual resources of feeding and treatment were employed.

On October 27th it was admitted to the hospital, and unpasteurized buttermilk was begun. In spite of stimulation and artificial heat, the temperature fell to 94° F., and the child died on October 31st. No effect was noted from the buttermilk.

CASE XXXV. was a similar case of failure. It lived two days after the buttermilk was ordered.

Tuberculosis of Kidney in Infant.—Morse's patient (*New York Medical Journal*, December 1, 1906) was only three years of age. He was breast-fed for the first four weeks. Then he was given a home modification of milk from untested cows, pasteurized at 155°F. Later he was put on unpasteurized milk. Attention was attracted to the kidneys when the baby was seven months old. Tubercle bacilli were found in the urine. He was at once given the fresh-air treatment and is now a large, strong, healthy three-year-old boy. The case suggests several important points in diagnosis. First, the importance of examination of urine in all obscure illnesses in infancy, especially if associated with fever; second, the necessity of considering tuberculosis of the urinary tract in differential diagnosis, even at this age. It also emphasizes the usefulness of fresh air in the treatment of tuberculosis, and shows that even young infants cannot only bear, but profit by the outdoor treatment, day and night, even in a cold climate.—*Journal of the American Medical Association.*

THE TWENTY-THREE HOUR TREATMENT.*

BY W. P. NORTHRUP, M.D.,

New York.

This paper contains but one idea, presents for consideration but one point. If anyone shall inquire what the words of the title mean, what the cure, and why twenty-three, that inquiry, I may say, justifies the title.

When I urge my patients to keep a sick or convalescent child in the open air many hours each day, just as many hours as rain, snow and harsh high winds will permit, I am always answered with the most complacent of smiles, with a manner of triumphant satisfaction, "So we do; we do just that." I have talked myself to a standstill over and over again trying to impress parents and nurses with the fact that two hours in the morning and an hour and a half in the afternoon is not all day, and not enough, that the long hours of the night count for something (*in the way of fresh air*), that to get the good of the air the child must live in it. It must sleep, eat, frolic, spend twenty-three of the twenty-four hours in good, cool, fresh outdoor air. I have the habit of speaking of it as twenty-three hour treatment, or the twenty-three cure. This in a crude way seems to suggest what I want. They begin by asking, Why not twenty-four hours? What is to be done with the other hour? If they do so ask it is the first gleam of light that they can be moved by persuasion, and are not of clayey consistence. Talking into a claybank kills.

I submit it as an inquiry: Is it not the everyday experience for the fresh-air-favoring physician on entering unexpectedly the sick room or convalescent's apartment to find the air exhausted, moist, malodorous, "mousy," and then in direct sequence to listen to the best of excuses for its being in this condition. Is it not so? It would seem that a special training must have been given to nurses for furnishing ready-made excuses for foul air and omission to ventilate. They have three reasons for housing a child to one for taking it out. For the twenty-three cure the nurse should be expert in everything but excuses.

A young child of fifteen months had recovered from a twelve days' bronchopneumonia. She had been treated, as a certain reprint has told most of this audience, in constant cold air in winter. Before her sickness and after it she was backward, had

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 30, 1906.

scurvy, and still had rickets. She was always pale, flabby, pot-bellied, perspiring and unable to stand. The excellent nurse who cared for the child during pneumonia left after convalescence was established, and the child was returned to the untrained but faithful attendant. All my directions as to living in best obtainable air ended in explanations and excuses. The child was not improving. She was what the sailors navigating in equatorial waters would call in the doldrums. She made no progress in any direction. In desperation I demanded the former nurse's return, and promptly put into execution what for the first time I designated twenty-three hour treatment.

The apartment in which the child lived was on the fifth floor, cornering on a broad avenue and a street leading straight into the Park. The corner room had three windows to the west and two to the south. In the middle of this large room in its carriage lived the pale convalescent all the hours of daylight. The months were February and March, the season stormy and about average temperature. The room was shut off from the rest of the house and swept with breezes. Incidentally, this condition of cold precluded guests from making long calls and from fatiguing the child.

It is unnecessary to say that the child acquired an appetite, digested its food, took on healthful color of the cheeks, slept, gained strength, learned to walk, and in every way developed into a normal child, catching up rapidly to the scheduled requirements of her age. The facts more important to mention are that she did not catch cold. In truth, before the winter had softened into spring she was facing into the raw winds of April, and every way resisting and ignoring the temperature, which no one in this room would enjoy without previous hardening to it. Quite as interesting is the total indifference the nurse acquired to the cold. Her white nurse's dress seemed strangely out of keeping with the range of the thermometer. The little girl has continued to *live* the twenty-three cure ever since. She makes cotton pies (snow) before open windows with an extra wrap of only a little shoulder shawl. All day and all night her room is swimming with outdoor air and she has not required a doctor's prescription from that day to this. This is an example of the twenty-three hour treatment in a child of approximately two years.

A second example is in an infant one month old. The infant having attained the age of four weeks, the accoucheur permitted

his charge to pass to the care of the family physician. It chanced that in this case the physician who was to care for it was a specialist who devoted his whole life to the care and feeding of infants and young children, and the infant was bottle fed from the outset. No conditions of environment or individual association bore upon the case, however, in the accoucheur's mind. It may be that by arbitrary enactment of the specialist accoucheurs, the time for relinquishing their bottle-fed babies may, in the future, be set at first dentition, closing of the fontanel, or at puberty. The infant had been kept in a room temperature of 70° to 72° F., carefully guarded from draughts, which means the ingress of fresh air, fed on a prescription made up in the house from the quart jar of milk of the family supply. The baby is said to have done fairly well.

Be that as it may, the infant which came into my care was not a proud specimen, was thin, barely gaining at all, jumping and jerking, and sleeping indifferently. The family were extremely anxious about him, which means at least that to them the infant was not doing very well. The prescription for milk was more or less uncertain in ingredients, but I was sure that it was made up each day alike by an excellent nurse, that it was producing passages which, though not perfect, were apparently becoming better gradually, and that probably the best I could do in the delicate situation was to leave the feedings unchanged for a few days.

Since it did not thrive on modified milk I resolved to modify the baby. I inaugurated a living in improved quality of air. The month was December and the child four weeks old. Delicate to an extreme degree would be the words to express the child's condition.

To restate the proposition: the infant was four weeks old, the month was December, the indications in regard to its care required the twenty-three hour treatment. I may add the house was very large, facing south, situated half a block from Central Park, on a wide street. What is more to the point, the nurse was excellent, and in the end I voted her the best nurse I have ever known.

Gradually the windows were opened, the doors into halls closed, the crib, which stood at first in the far corner, was gradually advanced to the open windows, and finally, after a couple of weeks, the infant was put in a laundry basket with an improvised carriage hood, and passed out on the balcony. Family friends

who knew the baby's delicate beginning of life were horrified, for the weather was about average for December. The whole proceeding was frankly pronounced brutal, and predictions of awful accidents filled the conversations of chance callers. The father who had a slight suspicion that this new boy baby was going to be a great pride to his family name (and the baby's first name hinted at rare links in famous historic lineage), had unconfessed anxieties and groans all to himself. For a few days the advance was slow and uncertain. At least nothing happened. Then the father's face cleared a little, and the nurse's face wore an expression of quiet courage, and even of hope.

A month later. Scene on the first morning after a snow storm: morning bright, snow gleaming, wagon wheels whistling and groaning. Baby near the window, wrapped in its blankets, basket and window showing evidence of the nurse's intentions. In due time the window opened and snapped shut, and the baby was out for his airing. The father, whose future lawyer or soldier son was thus punched out into the elements in a thirty-five-cent laundry basket, was discovered hovering near, and the only expression which escaped him was, "Ah, the poor little man!" and he departed. The thermometer on the casement near the basket registered 10° F. I saw it myself.

I mention these incidents because they belong to the subject. I make no mention of drugs, for he never has had any except one or two doses of castor-oil. When the father disappeared, leaving his child in the basket alongside a thermometer registering 10° F., and could raise no protest, only murmur, "Poor little man!" the day was won. The baby must be thriving.

So it was. The boy gained, slept, piped for his meals and slept again. The room was swimming with air. On rainy and snowy days he was brought just within the dry spots on the balcony, and when the gusts of rain became boisterous he was brought in, and the thirty-five cent laundry basket was placed on a low table between two windows. There never was a northeast storm in mid-winter, or a combination of snow, rain, slush or sleet, which kept him from having all the bracing effect which comes of cold, fresh flowing air.

Result.—During his little life, now of nearly seven months, he has not lost more than one day of feedings. He had no colds, he regularly gained, all his functions were normal, and no one would ever call him delicate. He has lost all that nervousness, is simply

very bright, almost too bright and alert for his own good, and is round, plump, happy, normal.

For twenty-three hours each day he has lived in the cold air. The twenty-fourth has been devoted to bathing. It is simply astonishing to what he became accustomed. He would lie on the bed without extra cover and kick and shout in a cold room in which one not accustomed to it would fear to loiter.

During the winter nearly everybody in the house had influenza—the nurse, mother, three other children, the nursemaid, butler, and all the parlor and kitchen maids. The only person who escaped and apparently enjoyed it as a joke was the party in the basket. Every day and every night was the same to him. His nurse, streaming at the eyes and nostrils, might run away to sneeze, might cough till her eyes bulged. To him all was a joke. He loved company, and they might groan with pain and make mouths from sore swallowing apparatus, he cooed and gurgled, and thought it all fun. The last word from the country is, "He's fit to burst his skin from fat."

To summarize:—

(1) The twenty-three hour cure or twenty-three hour treatment consists in living twenty-three out of the twenty-four hours in the best obtainable cool flowing fresh air.

(2) The treatment is especially excellent in convalescence from acute illness, in cases of delicate infants and young children not thriving.

(3) The quality of cold or cool flowing fresh air is essential. Cold air may be stale. Air may be oxygenated and free of odors and yet be warm. The air should be flowing freely and cold.

(4) Cold fresh flowing air has uniformly certain effects upon young patients. First they sleep. They remain quiet so long as they are in the open air, and sleep most of the time. The quieting effect is well proved. Second, they take more food and assimilate it better.

(5) Patients in the open air rarely catch cold, much less often than those kept habitually in warm rooms. Something depends on the nurse, of course, but in a wide experience with different nurses selected by chance, the patients have rarely caught cold. In the whole winter's experience at Sea Breeze no child has developed pneumonia.

Finally, this paper does not intimate that the writer is the only one who practises the twenty-three cure. Everyone pro-

fesses to advise fresh air. It is hoped in this paper to "standardize" fresh air, to estimate its dosage. The main interest is to shorten the conversation of the persistent mother or nurse who shall have, in spite of us, begun that endless list of explanations and excuses.

If the twenty-three treatment is accepted and once fairly begun, it is not probable that the physician will be obliged to talk into the claybank of indifference and misunderstanding on the part of the family and to his own discouragement and exhaustion.

DISCUSSION.

DR. GRAHAM.—Like everyone else, I have been greatly interested in the open-air treatment for children, and it occurred to me that the hospitalism that we talked about so much five or six years ago could be largely eliminated if we could introduce into our hospitals this open-air treatment. During January, February and March of this year I was on duty in a certain hospital and I found perhaps thirty children who had been properly fed—there could be no question about the feeding—but were not doing well. I had seen the same class for two or three years and the mortality was great. The very first day I went on duty I saw the head nurse and people connected with the hospital and had them look up plenty of clothing for these children, carried out on the porch five or six of the beds and had the children carried out the first thing in the morning and kept there all day. My resident, who was most enthusiastic in regard to the treatment, kept careful records of all these children. The results were simply astonishing. The children first stopped losing in weight and then began to gain, and the results were most gratifying. I believe that hospitalism can be eliminated if we take these children and bundle them up in blankets and have them live in the open air all day long. I remember a case two years ago of a child six years old who was dying of tuberculosis, and the mother was expecting to be confined within a few weeks. The child of six years died of the tuberculosis, and in September the mother gave birth to her baby. I was asked to see the infant and suggested the open-air treatment. It was one of the most severe winters we have ever had and that child was taken outdoors and kept out every day that winter, unless it was snowing or raining, regardless of temperature. The child, now about twenty-two months old, is unusually strong and vigorous.

DR. HAND.—The value of the "cure" is not alone in convalescence, as I have just had an experience with its use in the course of 2 cases of infectious fever. In each of the two hospitals at which I am on duty at present there was a typhoid fever patient with hemorrhages and with the development of the typhoid state to a marked degree. It occurred to me that perhaps unlimited

fresh air would be beneficial, and I put one patient in the sun-parlor with the windows wide open; the low, muttering delirium ceased in six hours and the patient has convalesced nicely. In the other case, at the Children's Hospital, it was impossible to use the sun-parlor, but the bed was put near an open window and screens were arranged so that the patient would get all the fresh air possible; this was followed by great improvement and recovery.

DR. LA FÉTRA.—Whenever we are confronted by a case that is not doing well the best thing to do is to put that child out in the open air. Personally, I am much indebted to Dr. Northrup for constantly and persistently insisting upon the necessity for cold, flowing, fresh air, and I want to add my experience in regard to this.

It was impressed very forcibly upon me some years ago when I went from the Nursery and Child's Hospital, where we had great difficulty with feeding cases (although there were good facilities for preparing the food), to the Randall's Island Child's Hospital, which is just across one of our rivers. There, with just as hard a proposition in the matter of feeding as one could have, with exactly the same methods so far as milk modification is concerned, the results were a great deal better. The children were much poorer subjects to begin with, but the results were excellent, and I attributed it to the fact that the children were taken out on the lawns and kept out there most of the day.

DR. WINTERS.—Most of the remarks have been in accord with what we all practice, but I am afraid that the outcome of much that is being done along this line is going to do harm to the sick babies and indirectly to the medical profession. There is a proper limit to everything. I do not believe in treating cases of exanthematous disease and lobar pneumonia by exposing them to zero weather. There is only one thing to consider, and that is the patient. It is well enough for tuberculosis; for convalescents, and where feeding is not going well, and perhaps even in bronchopneumonia, but not in lobar pneumonia, and I enter a protest against the placing of a patient of any age with lobar pneumonia in a room with the temperature at zero.

DR. W. P. NORTHROP.—(Closing discussion.)—I purposely avoided the discussion of other acute diseases, because that brings in so many points. The idea to be emphasized is that people will say the child is kept out all day when perhaps it has been out but an hour or two; that is what brought out this paper. The word "hospitalism" has taken leave of the books of the Presbyterian Hospital for ever. We dropped the temperature of the rooms and improved the ventilation. The results have been so good that everybody from the superintendent to the elevator boy and the man that takes out the ashes, is interested and convinced that the one way to cool people if they are too hot is to turn cold air upon them. That, however, is not what I had first in mind.

It is simply to keep the child who is not thriving well out in the open air many hours a day, and I purposely limited it to private practice. In a hospital you can do what you like, but in private practice, where there is perhaps a doting grandmother and many friends, it is the most difficult thing to have your ideas carried out. The more they love the children the more they will shut all the windows to guard them from drafts. I always feel quite sure about a patient that is out-doors; it is safe if it is clear out-doors. If before an open window and the warm room is behind it, the case is less safe.

The Genital Crisis in the Newborn.—R. Ronme (*La Presse Médicale*, July 19, 1905) calls attention to what he considers to be a genital crisis, arising soon after birth, in the newborn. The changes in the skin which belong to the formation of the vernix caseosa and fetal acne are the signs of an infantile puberty. The phenomena of puberty are all due to the establishment of the internal secretions of the ovaries and testicles. All these phenomena are imitated to a less degree in the first weeks of life. There is sometimes observed in little girls, about the sixth or seventh day, a true hemorrhage from the genital passages, corresponding to the menstrual discharge. It is variable in amount, but sufficient to form a drop on the labia. It lasts no longer than thirty-six to forty hours. It occurs in 35 per cent. of all cases. When this does not occur, if the vaginal secretions are examined, red blood corpuscles will be found. It is the result of modifications going on in the uterus. The uterus diminishes in size during the first week of life, and decreases up to two years of age. When this early hemorrhage occurs there is a marked congestion of the uterus, and subepithelial hemorrhages take place. Some believe that there is no congestion of the ovaries, while it is stated by others that the Graafian follicles are already formed. A similar phenomenon occurs in the testicles of the boy, a passing congestion. The prostate is congested, increased in volume, the glandular epithelium filling the canals of secretion. Hydrocele that is soon absorbed is quite frequent, due to changes in the testicles. On the sixth to eighth day after birth both sexes have a congestion of the mammary gland, with secretion of creamy fluid; this occurs in 41 out of 100 cases. It is produced by proliferation of the epithelial elements, and their transformation into a milky fluid. Involution goes on naturally until the gland returns to the natural size. The vernix caseosa and milary seborrhœa of the newborn also belong to this crisis, as well as fetal acne. There are two theories as to this crisis; Jacquet tells us that this is the close of the development of the genital organs, which begins at the fourth month, and ends at birth. Halban refers it to the internal secretion of the placenta acting on the fetus in the womb, and ceasing at birth. This is the process of involution following its action.—*Medical Record.*

A NOTE ON THE REDUCING POWER OF URINE FOLLOWING THE ADMINISTRATION OF UROTROPIN.*

BY I. A. ABT, M.D.,
Chicago, Ill.

A ten months' old child came under treatment during the past winter, suffering from pyelitis. The disease ran the usual course, characterized by irregular fever, wasting and prostration. The urinary analysis showed a great quantity of pus, some blood, and epithelial cells. The bacteriological examination of the urine showed a preponderance of colon bacilli. There was no sugar reaction in the first specimens of urine examined. The usual treatment by urotropin with large quantities of water was instituted. The child made a slow recovery from the pyelitis; it gained some in flesh and strength, and was taken from Chicago to a Southern resort for the remainder of the winter. The physician who made the examination in the Southern city reported that the urine was free from pus, though it contained a very considerable amount of sugar. The child was still taking the urotropin. Some of the urine was sent to me for examination, and it was plain that it showed very decided reducing action with the copper solution, though it showed no reaction with the polariscope or with the fermentation test. This reaction seemed of some practical interest to me, and I determined to administer the drug to a number of children in the hospital wards so that the effect on the urine might be observed. I also made a considerable search of the literature, and could find no reports on the reducing action of urine caused by urotropin. For this reason the reaction is made the subject of a brief report.

Considering the nature of urotropin, we know that it is a hexamethylenamin amine, $C_6H_{12}N_{24}$, and is made by the action of ammonia on formaldehyde, $4 NH_3 + 6 CH_2O = C_6H_{12}N_4 + 6 H_2O$. Urotropin is a very unstable compound, and it is readily decomposed by weak acids or by acid salts in solution, particularly if the solutions are warm. For this reason urotropin acts best if the urine is kept acid during its administration. The acid urine tends to liberate the formalin, which again quickly combines with

*Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, June, 1906.

the alkaline bases in the urine, forming salts (formates). The urotropin circulates unchanged in the blood, and if the urine is alkaline in reaction it is eliminated unchanged with the urine. In this case no antiseptic action whatsoever is secured. Formalin acts as a mild diuretic, and if the urotropin be continued for a considerable time, even in moderate dosage, hematuria, strangury, diarrhea, and abdominal pain with albuminuria and cysturia may occur. These conditions tend to disappear upon the discontinuance of the urotropin.

We found by making solutions of urotropin that it itself does not reduce copper or bismuth tests. It is inactive to polarized light, and does not show any fermentation test, but if the urotropin is broken up, either by heat or by the addition of a few drops of acid, or by the addition of acid phosphate, as it occurs in normal urine, formalin is set free from the solution and will reduce a copper solution, producing a greenish-yellow precipitate. If present in sufficient quantity, it will reduce bismuth test solutions. Formalin has no influence over polarized light, and does not show any fermentation test. The following children received urotropin and the urinary reactions were carefully observed:—

CASE I.—C. K., aet. six; admitted January 27, 1906; discharged March 13, 1906. *History*.—General adenopathy with elevation of temperature to 104° F. Secondary anemia. *Diagnosis*.—Glandular fever. Treatment with Fowler's solution, 2 minims, three times a day; increased 1 minim daily up to 10 minims. Two X-ray exposures, with the result of general diminution of the size of the glands and reduction of temperature to normal. Urotropin was given in doses of 3 grs. three times a day. Urine was normal before the administration of urotropin. The urine was examined twenty hours later. At this time it showed a slight yellow precipitate with Haines' solution. The bismuth test was negative; the fermentation test was negative. The urine remained otherwise normal. The urotropin was continued and the urine was tested daily. The reduction of Haines' solution by the urine was decisive for six days. After six days the urine began to show a trace of albumin and an occasional blood corpuscle. The reaction with Haines' solution now began to be slight or indecisive, and remained so. The urotropin was discontinued and the reaction disappeared entirely.

CASE II.—Harry K., aet. one; admitted January 22, 1906; dis-

charged February 27, 1906. *History*.—Protracted lobar pneumonia, with moderate temperature, remitting several days at a time. A complicating otitis media occurred. Later measles developed. Urotropin was administered in 1 gr. doses three times daily. The urine contained a trace of albumin before giving urotropin; otherwise it was normal. The urine was examined twenty hours after the administration of the first dose of urotropin, and it showed then a slight reducing power with Haines' solution. Other tests were negative. The urine continued to give the reaction for five days; then the urotropin was discontinued and the reaction gradually disappeared. The urine continued to show a trace of albumin, but no other change.

CASE III.—M. T., aet. eight; admitted November 13, 1905; discharged February 28, 1906. *History*.—Operated for osteomyelitis of femur twice. Had chickenpox. Urotropin, 4 gr. t.i.d.; no other medicine given. The urine showed a trace of albumin before administration of urotropin; otherwise normal. The urine was examined daily; at first it caused slight reduction of Haines' solution, but later a decided reaction occurred, which remained several days after the urotropin had been discontinued; then it became indecisive, and finally disappeared. The urine showed no other change, save a trace of albumin.

CASE IV.—E. C., aet. seven; admitted November 28, 1905. *History*.—Trauma of left leg. Developed osteomyelitis of left tibia, and was operated upon twice for the above condition. Urotropin, 3 grs. three times daily; no other medication. Urine was normal before administration of urotropin. It gave no reaction with Haines' solution until forty-eight hours after first dose was given. The urotropin was given for seven days; the urine then showed a trace of albumin; occasional blood corpuscles, and a few hyalin casts. The reaction with Haines' solution continued for several days after the urotropin was discontinued, and the urine became normal.

CASE V.—J. D., aet. twelve; admitted January 22, 1906. *History*.—Operated January 26th for appendicitis. Following day temperature of 104° F.; rapid pulse. Leukocytosis, 72,000. Wound discharged pus. Recovered. Urinalysis showed a plain trace of albumin and several hyalin and granular casts. *Diagnosis*.—Appendicitis, with peritonitis and pulmonary tuberculosis. Nephritis.

Urotropin was given in 5 gr. doses three times daily; no other

medication. No reaction with Haines' or other sugar tests was obtained in this case, although the urotropin was administered for twenty-four days, probably due to the lack of permeability of the kidneys caused by the nephritis. The albumin increased during the administration of urotropin up to $1\frac{3}{4}$ per cent. volume (Purdy); casts increased in number, and besides it showed increased renal epithelia, blood and moderate amount of pus.

CASE VI.—I. G., aet. thirteen; admitted December 26, 1905; discharged March 14, 1906. *History.*—Patient admitted to hospital for treatment of chronic valvular heart disease with broken compensation. There was cardiac hypertrophy with dilatation, and a double mitral lesion. Also chronic nephritis. Urotropin was given in doses of 6 grs. three times daily. Urinalysis before administration of urotropin showed a trace of albumin, and a few hyalin casts; otherwise normal. Urine was examined daily after first dose of urotropin, and for two days the reaction with Haines' solution was negative; then it became decided for two days, and again disappeared. The urine now showed albumin $6\frac{1}{2}$ per cent. volume (Purdy); it also contained pus and blood. Several hyalin and granular casts. The urotropin was now discontinued, and the urine gradually cleared up, until it had reached about the same condition as before administration of urotropin. This case, like the previous one, tends to show the effect of the irritation of the kidneys by urotropin, and also the lack of permeability of the kidneys in nephritis.

CASE VII.—E. R., aet. ten; admitted September 24, 1905. *History.*—Tuberculosis of head and shaft of femur. Operated September 25, 1905. Operated again for same condition February 24, 1906, with resection of head of femur. No medication. Urine showed a trace of albumin, and slight deposit of pus; otherwise normal. Urotropin administered in doses of 4 grs. three times daily; the urine promptly gave a slight but decided yellow precipitate, with Haines' solution, the day after drug was begun, which continued throughout the administration of urotropin, and then disappeared. The pus disappeared from the urine, but a faint trace of albumin still remained.

CASE VIII.—B. S., aet. three and one-half. Admitted February 21, 1906; discharged March 10, 1906. *History.*—Trauma of right groin. Local swelling above bladder. Cystitis. Urine showed trace of albumin and slight deposit of pus; otherwise normal. Urotropin was first given in doses of 1 gr. three times

daily. The urine remained unchanged, save increase in albumin up to $3\frac{1}{2}$ per cent. of volume, and pus, $2\frac{3}{4}$ per cent. of volume (Purdy). The urotropin was now increased to 2 grs. three times daily. The urine showed the next day a slight reaction with Haines' solution, which continued throughout the administration of urotropin; the albumin and pus continued as before. The albumin and pus thereafter gradually diminished, and finally disappeared.

NOTE.—All the urines had an approximately normal acid reaction to litmus throughout the administration of urotropin.

CONCLUSIONS.

(1) The administration of urotropin will cause the urine to reduce copper solutions after the drug has been administered for some time.

(2) Urotropin does not ordinarily cause the reduction of the bismuth test solutions. Such urine has no action on polarized light; it does not show a fermentation test.

(3) The continued use of urotropin may give rise to albuminuria, with the presence of blood and casts.

(4) Nephritis prevents the reduction of Haines' solution by diminishing the permeability of the kidneys for urotropin.

(5) A patient with normal kidneys secreting acid urine will eliminate urotropin very rapidly, and this can be demonstrated by the reducing action of the urine on copper solution.

I am deeply indebted to Dr. Carl Irenaeus, pathologist of the Michael Reese Hospital, for his kindness in making the urinary analyses.

Traumatic Pneumonia.—D. Galluzzi (*Gazzetta degli Ospedali*, May 27, p. 659).—A youth, aged fifteen, received, on February 15th, a sharp blow in the left mammary region. Cough and expectoration of frothy, bloody fluid immediately followed. Examination of the chest was negative. The cough, pain, and bloody expectoration continued until March 1st, when he had chills, lancinating pains under the left breast and a temperature of 101.3° . On the 2d, there were in the left chest diminished movement and vocal resonance and crepitant inspiratory râles. Lobar pneumonia with herpes labialis developed. The crisis occurred on the seventh day and recovery followed. But after five days a new focus developed at the left base posteriorly. Resolution took place in two days.—*The Medical Review*.

ON CERTAIN SOCALLED "BAD HABITS" IN CHILDREN.

BY JOHN THOMSON, M.D.,
Edinburgh.

No consideration of the nervous and mental derangements of infancy would be complete which omitted the consideration of the curious group of minor psychoses which, for want of a more distinctive name, are usually referred to as "bad habits." This very interesting group includes such tricks as pica, or dirt-eating, sucking the tongue, thumb, etc., biting the nails, head-rolling, head-banging, rocking and swaying movements of the body, and masturbation.

All these habits consist in a morbid exaggeration of an insignificant normal action. The normal act causes little pleasure to the healthy child, while its morbid counterpart has an extraordinary fascination for the children who practice it. They are commonly met with, and are apt to be specially persistent, in children with other neurotic manifestations. It may not, perhaps, be justifiable to say simply that these habits are infantile hysteria. Certainly, however, they occupy among the diseases of infancy a very similar position to that held by various hysterical affections among those of later life.

The essential character which serves at once to distinguish these habits from certain motor neuroses (*e.g.*, spasmus nutans and habit-spasm), which some of them superficially resemble, is their *deliberateness*. The child's will is implicated; and what he does is done intentionally, at first at least, because he likes doing it. They have a strong tendency to occur when the patient is feeling dull and not being interested by his surroundings. They are almost always stopped when the child's attention is taken up with anything that interests him.

PICA OR DIRT-EATING.*

The children who suffer from this habit have a craving to eat such things as earth, gravel, cinders, sand, wall-plaster or paper. Sometimes they chew and swallow their own hair, and in rare cases they will even eat fecal matter. The natural instinct which

* "On Pica or Dirt-eating." *Edinburgh Hospital Reports*, Vol. III., p. 81, 1895.

tells us what is and what is not good for food seems in them altogether defective; and the discomfort which must result from the very abnormal things which they swallow does not teach them, as it ought, to avoid such things in future. They suffer, as it were, from an hallucination of the appetite. In most cases there is no ascertainable local or general disease, and the children seem otherwise normal. Sometimes, however, we meet with cachectic cases in which the craving begins with, and evidently depends on, a diseased condition of the alimentary tract, or on anemia, and passes off when these are cured. The practice is very common among mentally defective children.

Pica is not at all uncommon, and generally begins in early infancy (six to eighteen months). As soon as the baby is placed within reach of the things he craves for, he tries to eat them. Thus, even before he can walk, he will be found licking the mud from his father's boots, or the dirt and gravel from the wheels of his own perambulator. When he begins to walk he gets access to broken plaster on the walls, and later to all sorts of other things. In the distinctly cachectic cases, the symptoms may set in at any age for the first time. In many cases only one kind of unnatural substance is taken; in others, a great variety.

If the habit is taken in hand soon after it has begun, it may usually be rapidly checked by the mother or nurse. If it has been allowed to go on for months, however, it may be very hard to stop. In the early "infantile" cases, there is a strong tendency to spontaneous recovery; during the third or fourth year, when the range of the child's interests in life are rapidly widening. Sometimes, however, the habit persists into late childhood or adolescence. Change of scene, *e.g.*, admission into a hospital ward, generally stops it at once for the time. When it does persist, no serious harm usually follows. Severe diarrhea is sometimes set up, however, and fatal effects from eating sand, gravel or hair have been recorded. The indications for treatment may be stated as follows:—

(1) *Treat the child's digestion.* Any local or general uneasiness tends to increase the craving.

(2) *Improve the general health.* These habits have a far stronger hold on the weakly; the strong readily throw them off.

(3) *Keep the child away from the substances* for which he has a morbid craving. All habits are strengthened by practice and their power lessens from disuse.

(4) *Change the child's surroundings*, if possible, and occupy his mind with new interests. Let him be kept happy and busy.

WETTING THE HANDS.

Occasionally children are met with who have a constant craving to put their hands into water or in some other way to wet them. This seems to be due to a delusive sensation of dryness, the skin being really normally moist. It is a difficult habit to check. I have known it to last for many years.*

BITING THE NAILS, ETC.

Traces of biting the nails are very often seen, and callosities on the hands and fingers from constant biting during emotion, are not uncommon, especially in nervous children. In treating nail-biting, it is helpful to keep all the nails cut as short as possible.

SUCKING OF THE THUMB OR FINGERS, THE TONGUE OR OTHER PARTS OF THE BODY, OR OF OTHER OBJECTS.†

The thumb and fingers are the parts most frequently sucked; less frequently the back of the hand, or part of the arm, or even, in young children, the big toe may be used. The other objects made use of are such things as the mouth-piece of a feeding bottle, a corner of the sheet or the night-dress, a kneaded-up piece of bread, etc. Generally the same thing is sucked every time; but, occasionally, the child changes from one thing to another.

The habit is usually "simple," but often it becomes complicated in an interesting way. Thus, a small boy who is punished when seen sucking his fingers gets into a way of covering the lower part of his face with his other hand to hide what he is doing. He soon finds an added gratification from breathing into his hand, and therefore always uses this "combination" even when quite alone. Occasionally, also, cases are met with in which the children become violently excited while sucking and injure themselves without seeming to notice it. For example, a patient of Lindner's, while sucking his thumb, worked with the little finger of the same hand in one of his nostrils till the blood came.

The habit of sucking usually begins in early infancy, but it may start at any time. The degree to which it gains a hold over

* "Case of Long-persisting Sensory Hallucinations in a Child." ARCHIVES OF PEDIATRICS, April, 1897.

† Lindner. *Jahr. für Kinderheilk.*, XIV., 1879, S. 68.

Thomson. *Child-Study Monthly*, June, 1896, p. 88.

children very largely depends on the passive if not active encouragement it receives from the nurse or mother. The nurse finds that to check the habit means provoking no end of restlessness, screaming and ill-temper; while, on the other hand, to encourage it is a very easy and almost infallible way of making the child quiet and easily managed—"good," she calls it.

The times when children are most tempted to suck their fingers, etc., are shortly before falling asleep, soon after waking, and soon after their bath; also whenever they are in a low or depressed state of body or mind, or are cold, hungry, or out of sorts. The duration of the habit varies greatly in different cases. Sometimes the nurse or mother weans the child from it very soon. In other cases it is allowed to continue until the child goes to school, and then is only slowly put a stop to by the notice of his school-fellows.

Sucking usually does little harm unless it is much indulged in or is accompanied by excitement; but it should, practically always, be discouraged. I have, however, seen a few cases where a baby suffering from severe whooping-cough or other distressing disease was more soothed by being taught to suck a "comforter" than by any sedative medicine.

When the sucking is accompanied by excitement, it is most important, though sometimes very difficult, to stop the habit. When the finger or thumb is used, this may be best effected by the application of a light anterior splint, or a stiff card-board sleeve to the arm, so that the elbow cannot be bent. Anointing the part sucked with aloes or quinin is also sometimes helpful. Generally, if left alone, the habit comes to an end of itself as the child grows older.

Sucking the tongue often begins in early infancy, and is difficult if not impossible to stop until the child comes to years of discretion. It is not a very common habit in normal children, and in them it often does not last long.

Tongue-sucking is an important and characteristic symptom of mongolism, and occurs in at least 80 per cent. of the cases of that condition*—usually in an exaggerated and persistent form.

* In 50 consecutive cases of mongolism in which I made inquiries about tongue-sucking, it was said by the mother to be present in 40. One of the 10 in whom it was said never to have been noticed was admitted to the Children's Hospital, and was there found to have the habit in a marked degree. The proportion of its occurrence may, therefore, really be considerably above 80 per cent. It is even possible that all these children may have some degree of the habit at some time of life.

In a doubtful case of mongolism, therefore, the presence of tongue-sucking may be regarded as a strong point in favor of this diagnosis. It is an interesting question whether the swollen papillæ and general sodden appearance of these children's tongues and their deep fissuring in later childhood may not be largely due to the persistent and vigorous sucking they have undergone.

RHYTHMICAL MOVEMENTS.

Some of the rhythmical movements of young children are certainly of the nature of "bad habits"; though others, as surely, are involuntary neuroses of quite another kind.

One of the most striking habits of this class has been described by Dr. Gee* as *Head-banging*. In this, the patient, who is generally a child between two and six years old, takes turns of facing his pillow and banging his forehead into it, as hard as he can, at intervals of a few seconds. This goes on sometimes for several minutes, sometimes for as much as an hour at a time. It may alternate with swaying of the body, or head-rolling, or some other habit. It takes place in some cases when the patient is wide-awake, and sometimes when he seems nearly or quite sound asleep. Sometimes the patients are deficient in intellect and sometimes they are markedly cachectic (*e.g.*, tuberculous).

Another similar habit consists in rhythmical *jerking or rolling the head from side to side* as it lies with the occiput on the pillow. This is sometimes, but without good reason, referred to as if it were a sign of brain-disease. The children who practice it are generally though not always rickety, and irritation of the scalp connected with excessive perspiration may very likely, in some cases, have to do with its commencement. Dr. Still† has made the interesting observation that it is often associated sooner or later with evidence of middle-ear irritation. The children who show this habit are generally babies under two whose necks are weak and whose head-movements, when they are in a sitting position, are feeble and uncertain. Older children occasionally show deliberate *nodding or shaking movements of the head*, while sitting up, which look like an exaggerated and intentional variety of spasmus nutans.‡

Another and a commoner variety of rhythmical movements consists in a *swaying or rocking backward and forward* of the

* *St. Bartholomew's Hospital Reports*, Vol. XXII., 1886, p. 97.

† *Clinical Journal*, November 21, 1906, p. 88.

‡ Thomson. *Scottish Medical and Surgical Journal*, July, 1900, p. 11.

trunk. The children sit with a solemn expression and slowly rock themselves forwards and backwards, sometimes for hours at a time, if they are left alone. This habit is particularly common in mentally defective and in blind children at all ages; but it occurs also, at times, in those whose brains and whose eyesight seem quite normal. It is often associated with one or other of the habits above described, and often with masturbation; and it is frequently regarded erroneously as proving the presence of the latter. A child who is commencing to practise these movements should at once be checked, and he should be made to stand up and to run about whenever they begin. In normal children who can walk the habit is easily cured in this way. In those who are too young to stand, the treatment is a much more difficult matter.

MASTURBATION.

Every now and then we are consulted about masturbation in children. The patients may be of any age, but in the majority of cases they are infants. Girls are much more frequently brought to us on this account than boys. This is probably partly because, in them, the nature of the symptoms is more apt to be overlooked and the movements attributed to internal distress of some kind or a fit, or to some other obscure nervous seizure.

The act is practised in various ways, *e.g.*, by rubbing the thighs together or rubbing the body to and fro on the seat on which the child is sitting, or by pressing the vulvar region against the corner of a chair or some other hard body, or less frequently, by help of the hands. The child seems intensely preoccupied at the time, and gets flushed and excited and often perspires. A sort of panting or grunting expiration often accompanies the act, and this is not infrequently referred to by the mother as a proof that the child is suffering. If the movements are stopped, however, the child always shows signs of annoyance. If the act is not interfered with, evident indications of exhaustion generally follow it.

The treatment of confirmed cases of masturbation in *older children*, who know that they are doing wrong, is often an extremely difficult undertaking, and one in which we have to be largely guided by the circumstances and surroundings of the case. In *young children*, however, the matter of cure is comparatively simple and hopeful. In them the habit is in no respect a moral offence, and it must not be treated as such. The parents' attitude

toward it should be firm but altogether unemotional. They should, in fact, treat it simply as they would any gross breach of ordinary good manners. The main indications for treatment may be summarized under the following four heads:—

(1) *Remove any local irritation present.* Phimosis, balanitis, vulvitis, hyperacidity of the urine, thread worms, etc., must be looked for and treated.

(2) *Attend to the general health and hygiene.* See that the diet is judicious and does not contain too much meat, and that the bed-clothes are not too heavy. Order a cold douche in the morning and plenty of open-air exercise during the day.

(3) *Take effective means to prevent the act mechanically.* In young children this is the most important indication of all. Where the children are young enough, and those in charge of them sufficiently methodical, to allow of its being satisfactorily carried out, the prognosis as to rapid recovery from the habit is very good. In children more than four or five years old, however, little can usually be done in this direction. The nature of the apparatus needed depends on the way in which the habit is practised. If the hands are used, the arms may be put up in rectangular splints. If the thighs are rubbed together, some sort of splint or other contrivance must be devised to hold the knees apart. The use of any mechanical restraint of this kind must, of course, be accompanied by ceaseless watching on the part of the mother or nurse all the time of waking. The times when special vigilance is required are before falling asleep, and on waking in the morning. Whenever the movements begin, the child must at once be made to change her position and to do, or take interest in, something else. If she is lying, she must be made to sit up; and, if old enough, to get up and run about. If this line of treatment can be carried out with any degree of regularity, the soothing character of the habit will be destroyed, and it will rapidly lose its hold on the child.

(4) *Get the child's thoughts off the habit as much as possible.* It is, of course, right that the child should feel the parents' or nurse's disapproval. Much punishment, however, and especially much talking to, often do very great harm by accentuating the importance of the subject and making the child think too much about it. A complete change of surroundings and of subjects of thought is a strong influence for good in the treatment of all these cases.

PRESENTATION AND REMARKS ON SOME FOREIGN BODIES SWALLOWED OR INHALED BY YOUNG CHILDREN.*

BY THOMAS MORGAN ROTCH, M.D.,

Boston.

In connection with an interesting case of a foreign body inhaled and detected in the lung by the X-ray, some other cases have come under my notice.

(1) A flat whistle, 2 cm. in diameter, was swallowed by a boy six or seven years old. No symptoms. Whistle was passed in eight days.

(2) A girl three years old swallowed a tin whistle similar to the one just described except that it had a smooth edge, was not so thick, and had a slightly greater diameter. There were no especial symptoms except that she was unable to swallow solid food and regurgitated almost all liquids. An X-ray four days later showed the whistle in the esophagus on a level with the last cervical vertebra. The whistle was also shown by the fluroscope and removed with the bristle probang.

(3) A girl four years old, without known cause, could not cry aloud and had difficulty in breathing for two days. An X-ray showed the presence of a hook in the larynx. The hook was then easily extracted and there were no complications or after effects.

(4) A girl seven years old inhaled half a peanut. She was seized with a violent spasmodic cough and dyspnea. The temperature went up to 104° F., and on the following day she developed a pneumonia of the left upper lobe in front. Six days later she coughed up the peanut. The pneumonia quickly resolved and complete recovery followed, the temperature, pulse and respirations becoming normal by the seventh day, and all signs having disappeared from the lung in thirteen days.

(5) A baby about six months old unfastened with its mouth a gold safety-pin from the cuff of its dress, and swallowed it unclashed. The pin was passed in forty-eight hours. No symptoms.

(6) A boy six months old passed from the rectum a straight pin with a pearl head. It was not known when he had swallowed it. There were no symptoms.

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 31, 1906.

(7) A girl nine months old, after vomiting from time to time for two and one-half months, vomited up a safety-pin unclaspd. It was much blackened. It did not cause any further symptoms, and it was not known that the infant had swallowed it.

(8) A baby about eleven months old inhaled a feather. It had frequent cyanotic and almost unconscious attacks with spasmodic cough for five or six months. An X-ray showed nothing. The attacks ceased after a violent attack of coughing; after which a small blackish mass was expectorated, supposed to be the disintegrated feather, but this was not proved definitely.

(9) A boy about eighteen months old picked up and swallowed three safety-pins, one of them unclaspd. On the following day there were no symptoms, but one of the claspd pins was passed and on the following day the second claspd pin came away. On the following day the baby was restless and cried a good deal; it was given an enema, which brought away the unclaspd pin.

(10) The case referred to at the beginning of my remarks and which led me to mention those first spoken of was that of a girl four years old, who entered the hospital February 10, 1906, with pulmonary symptoms, and with the statement that she had swallowed the arm of a china doll in October, 1905. At that time she became cyanotic and had a severe attack of coughing. Since that time she had considerable dyspnea, had never seemed well, had coughed spasmodically from time to time, but had been up and about, with a good appetite, sleeping well, and with no history of any other symptoms. On entering the hospital, although she did not look very sick, her temperature was $102\frac{1}{2}^{\circ}$ F., respirations 62 and pulse 165. She had a short, irritating cough and there was marked dilatation of the *alæ nasi*. There were signs of consolidation in the lower right back and the respiratory excursions were greater than in the left. In the left back there was lessened vocal resonance and tactile fremitus, and at about the middle there was hyperresonance over an area of 5 cm. in circumference.

The rest of the physical examination was negative, except that there was leukocytosis of 55,500. An X-ray showed a pneumonic process corresponding to the clinical examination of the right lung. Nothing was found by the X-ray in the left lung. This pneumonic condition showed well in the plate, but does not show in Print I.

Print I., taken February 10th, shows the presence of a foreign body (the print being full size and the plate taken with the child lying on its back on the plate). The shadow was as seen in the print, $1\frac{1}{2}$ cm. long and $\frac{1}{2}$ cm. in diameter, situated at the junction of the seventh rib with the left edge of the sternum.

This corresponded to the piece of the arm which had been broken off from the child's doll. The diagnosis was made of the inhalation of a piece of the china arm occluding probably one of the left bronchi and followed by pneumonia of right lung with probable interference of expansion of the left lung, as an aspiration of the left chest was negative.

Plate II., taken February 10th, shows the same picture. The child's symptoms increased in severity, but the white count dropped to 23,000 on February 12th and to 18,300 on February 13th. The sputum was purulent and showed numerous micrococci. No tubercle bacilli, influenza or pneumococci. On February 20th there were a few pneumococci. February 25th the white count was 16,400 and the physical signs in the lungs the same.

Print III., taken February 13th, showed that the position of the arm had changed, the shadow now being seen between the sixth and seventh rib.

Print IV., taken February 14th, shows position of shadow about the same, but this picture was taken with the child lying on its face on the plate. The temperature at this time was ranging from $99\frac{1}{2}^{\circ}$ to 101° F., with pulse 140 and respirations 150-160.

March 12th the child coughed up the china arm. An X-ray was taken immediately and it was found that the shadow had disappeared; but the pneumonic process still showed (and this time in the print, also). The white count was 14,700. On March 2d the left lung was practically normal and there were signs of resolution in the right lung.

By March 6th the cough, dyspnea and general symptoms had almost disappeared. The appetite was good and the child was up and about and was looking well. The temperature, pulse and respiration were practically normal by March 1st and the signs in both lungs had disappeared. Discharged well, March 28th.

Although the bronchoscope had been used successfully in a number of cases, it was not deemed advisable after a few attempts to use it further in this case, as the X-ray showed the arm was so deeply situated in the chest.

All the X-rays were taken by Dr. A. W. George, of the Children's Hospital, by whom the greatest skill was shown in not only getting the plate to show the various shadows, but by intelligently enabling me to explain satisfactorily the thoracic symptoms at a time when my clinical evidence was doubtful and the fact of the child having really swallowed the china arm was uncertain.

DISCUSSION.

DR. NORTHROP.—I would remind the society of the work being done with the bronchoscope. Dr. Emil Mayer has been working up the subject and I was called in to see a case in which it was used. A child seven years old had aspirated a bean, and Dr. Mayer was able to see it and remove it through the bronchoscope. In a subsequent case he was able to remove the body more promptly than in this one. This one had been in the larynx so many days that it had become swollen and impacted; the child died of bronchopneumonia.

Another case was that of a child that came in with a history of having swallowed a bobbin about the size of a quarter of a dollar. For thirteen days he could only take a little milk. The X-ray showed the foreign body and an operation was performed for its removal. The surgeon said these cases generally died of sepsis. The wound was left open with drainage. For several days the patient did very well, then developed a double pneumonia. We put it up on the roof—open air treatment—and it got well.

DR. HOLT.—I think that there is nothing we meet that at times presents more obscure symptoms than these cases. A physician in Rochester related to me an experience with his own child. The infant, five or six months old, was accustomed to play sitting on a bearskin rug. Once or twice they had found hairs in the child's mouth, but thought nothing of it. The child afterward became seriously ill with intestinal symptoms which lasted several weeks; finally a great mass of hair was passed and rapid recovery took place. It must have been in the intestine at least two months.

Another case came under my care where the child had swallowed ten safety pins, which were passed one after the other. Last winter a friend of mine called me on the telephone to ask advice regarding a baby six weeks old that had swallowed an open safety-pin. A surgeon advised immediate operation, but from my previous experience I advised waiting. X-ray pictures were taken daily and the course of the pin watched. It passed through with safety. I think surgeons are too ready to operate on these cases. If the foreign body gets beyond the stomach it will usually pass safely.

DR. KOPLIK.—I had a case lately in which the child had

aspirated some peanuts, developed pneumonia, then localized abscess of the lung. At operation the pus contained the residue of the peanuts.

Speaking of the bronchoscope, in our hospital it was useful in extracting a bent pin with glass head from the bronchus of a child, and I would like to ask Dr. Rotch why he did not use the bronchoscope in the case of the china arm.

DR. ROTCH.—I think it was used. We have had a number of cases in which it was. Dr. Cooley, in Boston, is very skilful in its use, and I think it is used very generally in Boston.

DR. GRAHAM.—I saw a case this winter which illustrates how long a foreign body may remain in the intestinal tract without doing harm. The case was that of an eighteen months old child with the history of having swallowed a small circular tin whistle about the size of a quarter. I saw the child two or three days later and it presented no symptoms. I instructed them to feed it on milk and carefully watch the stools. After three or four days the whistle had not been found. A week later they reported that the bowels moved daily but the whistle was not passed. There was no vomiting, no evidence of pain, no abdominal distention, no symptoms of illness or disturbance of any kind. I decided that the whistle had been passed but not noticed. Six weeks later they brought the child back, saying that the whistle had been passed only a few hours before, and they showed it to us. The case interested me very much, because it was the longest time—six weeks—I had known of a foreign body of that size being retained in the intestinal tract.

DR. EATON.—I saw a case some days ago, a child brought into my office, the mother saying that it had been playing with pins and had swallowed one. The child was two years old. I opened the mouth, depressed the tongue and saw what looked like a bristle or fish bone sticking out of the tonsil and curved upward toward the pharyngeal wall. On catching hold of it I saw how it was embedded. The pin was bent at an obtuse angle in the upper third, the head being embedded in a crypt of the tonsil with the point in the pharyngeal wall. I pushed the head still further into the crypt, and, disengaging the point, brought it out.

Dr. Chevalier Jackson, of Pittsburg, Pa., has been doing some good work with the bronchoscope, and some weeks ago demonstrated its use to us on a young man with a tracheal wound.

DR. HUBER.—We had a case some time ago of a boy of seven or eight years who, while eating some peanut candy, aspirated a peanut. He came to the clinic with a well-developed localized pneumonia, and while the grandmother told us the story not much attention was paid to it. A few weeks later the peanut was obtained.

Another case that I have already reported, was that of a child

with the history of irregular temperature for five weeks. On coughing there was a fetid odor and the cough was of the paroxysmal type. Going over the various causes of localized gangrene it seemed plausible to presuppose the possible inhalation of a foreign body, and an X-ray picture was taken which showed plainly a curved wire nail. There was septic pneumonia on the left side. We were told then that five months before the child, while groping on the floor, had had an attack of strangling, but which disappeared very quickly, so that nothing had been thought of it. The inference was that the child had picked up the nail and swallowed it. The child was in a bad septic condition, and although an operation was done to remove the foreign body the child almost collapsed and we were obliged to desist from further efforts.

DR. ADAMS.—I quite agree with Dr. Holt that in these cases so many foreign bodies are passed by the intestinal tract without harm that it is better to wait and watch the case. We may use the X-ray and wait to see if symptoms develop. I have myself seen the largest sized open safety-pin passed through the intestinal tract of a baby; fortunately it came through with the round end down. On four or five occasions I have been disappointed at not seeing the foreign body passed in a day or two and then had a history of the child having some trouble in defecating, and either told the mother to introduce her finger, or have myself introduced my finger, into the rectum and extracted the foreign body.

To show that sometimes our anxiety may be a little overwrought, recently a lady telephoned to me in great alarm that her baby, about a year old, had swallowed a baby pin—that there was no doubt about the swallowing of it. I got the history that she had been at her father's spending the afternoon; that she had pinned on the child's collar with this little enamel pin, and that when they got ready to leave the pin could not be found—the baby had swallowed it. They had ransacked every portion of the room, shook the bed-clothing, swept the floor, but the pin could not be found, and they were very much alarmed. I told them to let the child alone and wait for the pin to be passed. They said, "Yes, but the pin is open." Notwithstanding that I advised waiting, I was anxious about it myself, as the child was the only granddaughter in the family. The next day they telephoned at stated intervals that the child had had stools and the pin was not passed. The second day there was the same report, but there were no symptoms. The third afternoon they telephoned that they had found the pin. I asked what time it had been passed, and the mother said: "Why, Bob (the father) had the pin in his outside coat pocket."

DR. HAMILL.—Very recently I saw a child with a history of regurgitation of food of some months' duration, the condition

having been a gradual development. We succeeded in passing a large-sized esophageal bougie without meeting with any obstruction. At a subsequent visit the mother referred to the fact that the child had swallowed a penny about a year prior to this time. Although rather sceptical, I had an X-ray taken which located the penny in the esophagus at about the junction of the middle and lower thirds. It was removed by means of a coin catcher. The symptoms cleared up immediately. It is difficult to understand how this coin became lodged and remained fixed in the esophagus for so many months.

Another case to which I would refer was one which did not occur in my practice, but the foreign body, with the report of the case, was sent to me by a former student, Dr. Suterline. He said that the child bore the name of George Dewey, but unlike his illustrious namesake he had not passed through danger, but danger had passed through him. It was the largest foreign body I have known to be passed, being an iron staple $2\frac{1}{2}$ inches long and $\frac{1}{2}$ inch wide. The child, whilst lying on its back on the floor, had been playing with it; when the mother turned and said, "Don't swallow the staple," the child promptly opened its mouth and the staple dropped in. The mother tried to remove it but could not. The child developed no symptoms until the staple reached the rectum, when some blood was found in the stools. The physician introduced his finger into the rectum and found the staple just within the sphincter, pointing downward. He told the mother the next time the child had a stool, to introduce her finger and guide the foreign body outward while the child strained; it was successfully passed in this manner.

DR. EDSALL.—One point that has been brought conspicuously to mind by the discussion of this subject is the danger that may be associated with the use of the X-ray. Some of the members that have discussed the subject have spoken in a very easy manner of using the X-ray frequently, even daily, in order to watch the progress of foreign bodies along the alimentary tract, or for other purposes that are not essential. Proper diagnostic use of the X-ray is not to be objected to; but it should not be forgotten that while, as a rule, the X-ray does not produce any serious results, it does occasionally produce more or less profoundly dangerous effects, particularly in persons that are already out of health. Many of the children that are exposed to X-rays, particularly in this connection, many of those that have foreign bodies in their bronchi, are more or less sick; and I think that the X-ray should be used in the most guarded manner in such cases. I have made a considerable series of studies of metabolism in persons that were being treated with the X-ray, and I know of no agent used therapeutically that has an equally potent effect upon metabolism in cases that respond to it actively. This being the case, it is only natural that at times it

should have very dangerous effects. I have seen two cases in which the patients were apparently killed after one exposure, and another patient that nearly died after one exposure; and I should like to emphasize the fact that the X-ray is an agent that not only takes pictures, but also has a profound effect on the organism. It should not be used, except with a full appreciation of its very serious influence, and unless the conditions directly indicate its use.

DR. ROTCH.—I agree with Dr. Holt that the surgeons are too ready to operate on these cases. They do not appreciate the fact that often these foreign bodies may be let alone.

Sometimes absurd mistakes are made with the X-ray. I recall a case where it was supposed the child had swallowed a pin. They took nearly all the clothing off and took an X-ray picture. A little flannel band that was worn was left on. The picture showed the pin and they prepared to operate, but the next time the baby was bathed they found that the pin had not been swallowed, but had slipped in behind this band and so was shown in this picture.

Infantile Mortality and Its Principal Cause—Dirty Milk.—Harrington (*American Journal of Medical Sciences*, December, 1906) finds the highest infantile mortality in this country in the District of Columbia, the lowest in Michigan. In Europe, Russia is the highest and Scotland the lowest. The chief causes in all countries are the gastrointestinal diseases. In the summer months, especially August, the mortality is highest, in the three winter months it is lowest. The first three months of life constitute the most dangerous period. Congenital debility is next to diarrheal diseases in the infantile mortality rate. The infantile mortality dependent upon defective infant feeding is a mortality of hand-fed infants. High infantile mortality is a class mortality, especially prevalent in cities and towns with their unsanitary habitations and unsanitary ways of living, especially among the poor. Illegitimacy has great bearing on infantile mortality, except in communities in which foundlings are cared for in public institutions. Cow's milk is not the natural food of human infants, and unsanitary dairying with its accumulations of harmful bacteria is the chief factor in causing high infantile mortality. The price of milk, considering the cost of preparing it for the consumer as it should be prepared, is believed to be insufficient. The remedy consists in insisting that all milk which comes to the market should be under sanitary conditions at every stage of its preparation.—*New York Medical Journal*.

LOBAR PNEUMONIA WITH UNUSUAL TEMPERATURE.*

BY F. HUBER, M.D.,

New York.

In the *Medical News*, December 15, 1900, La Fétra reported a case of infantile grip with unusual temperature range. Churchill, *ARCHIVES OF PEDIATRICS*, June, 1904, cites a case of pneumonia with unusual temperature record.

In La Fétra's case, there were wide excursions of temperature, a fall of $10\frac{1}{2}^{\circ}$ F. being noted on one occasion. On the sixth day the temperature dropped to 94.6° F., and on the tenth day the record showed 94.4° F.

In the case reported below, the marked variations were not due to the treatment. The condition of the child was such that active interference was not indicated. Mustard packs and colon irrigations, resorted to at times, did not produce any decided reduction in the fever (see dotted lines in temperature chart). Coal tar derivatives, as antipyrin or phenacetin, were not employed as antipyretic measures.

George H., seventeen months old, born in New York, of Russian-Polish parentage, was admitted to the Children's Service, Beth Israel Hospital, March 7th, 1904.

Parents are living and well. The first child died in convulsions, nine others are living and in good health. The patient was breast-fed for the first month, then raised on the bottle. Began to walk at age of twelve months. Four days before admission was taken acutely ill with high fever and great restlessness without any history of a convulsive seizure. The attending physician reported an evening temperature of 106° and 107° , with a decided fall in the morning.

On admission the patient was found to be well nourished and in excellent condition. Dyspnea marked, face flushed, no herpes, no ear trouble. Skin and mucous membrane normal. Tongue clean and moist. Pharynx and tonsils negative, no glandular enlargement.

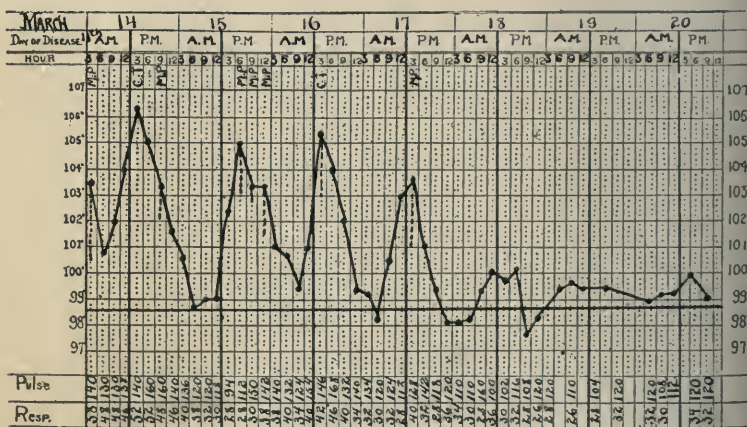
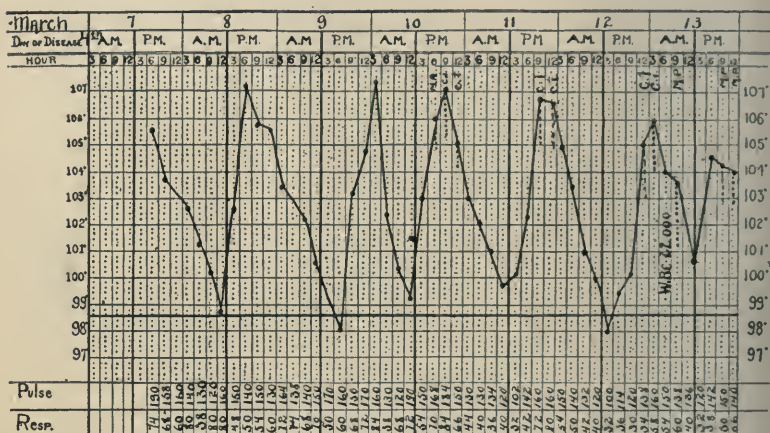
An examination of the right lung revealed the physical signs of pneumonia in the entire upper lobe. The rest of the lung, as also left, normal.

Heart normal, spleen not palpable, abdomen soft, not dis-

*Read by title at the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, June 1, 1906.

tended. No edema of the lower extremities. Urine amber, clear, specific gravity 1,018, slight trace of albumin, no sugar. Microscopic examination negative. Blood negative for plasmodia.

Aside from the peculiar and unusual temperature range, the subsequent progress of the case was uneventful.



The case was carefully studied throughout its course, but no explanation was found which would throw any light upon the cause or causes of the anomalous febrile variations occurring in the patient with the physical signs of a lobar pneumonia involving the upper lobes of the right lung.

No theories are offered; the history and the charts are presented as a clinical contribution.

PRIMARY INTESTINAL TUBERCULOSIS IN A NURSING BABY.—PROBABLE INFECTION THROUGH A TRAINED NURSE.*

BY IRVING M. SNOW, M.D.,
Buffalo, N. Y.

About March 1, 1905, a girl baby was born to healthy young parents, who had an older boy, aged one year, in good health. Early in April the boy died after an illness of six days. He was attacked with a diarrhea and a temperature of 106° F., which subsided after two days, and recurred on the fourth day with frequent mucous, bloody stools, temperature 105° - 107° F., ending with terminal convulsions on the sixth day. As later events showed, this illness was probably tuberculous in character. The younger baby was nursed by its mother and thrived for two months.

At this time there appeared a slight, irregular fever, 100° - 103.5° F., which for two weeks did not influence the child's nutrition, as it steadily gained in weight. The attending physician sought in vain for an explanation of the temperature; the breast milk was analyzed and found to be good. Laxative cereal gruels and intestinal irrigations were given, with the idea that the fever might be intestinal in origin.

May 14th I was asked to see the child and explain the persistence of the fever. The child was plump, looked exceedingly well, and a thorough physical examination showed no positive lesions except that the child had occasionally a left internal strabismus. The urine was normal and a blood examination showed no leukocytosis, merely a mild secondary anemia. There was no inanition, intestinal putrefaction, pneumonia, typhoid fever or kidney lesion.

A faint suspicion of lues in the father gave rise to the idea that the temperature might be of syphilitic origin (an entirely erroneous theory), and the baby was given mercurial inunctions.

From May 14th to June 1st the fever continued 100° - 104° F., the baby nursed and slept well and did not lose in weight. June

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 30, 1906.

1st a few small papules appeared on the trunk and limbs, and a consultant dermatologist advised continued mercurial inunctions.

June 8th the temperature varied— 101° - 104° F.—more papules and pustules developed on the inner side of the left thigh and on the forehead and front of the chest. The baby began to cough and occasionally show respiratory distress, with nothing on throat or chest.

June 10th, in addition to the fever and increasing prostration, the spleen began to enlarge—the weight remained the same, twelve and one-quarter pounds—the stools were normal. The continuation of the fever and increasing size of the spleen in the face of specific treatment now caused the abandonment of the mercurial inunctions, which we applied to only one pustule on the foot.

June 12th-20th.—The child began to fail rapidly; there was much respiratory distress and coughing; the temperature remained high; there was occasional vomiting and frequent stools; a bronchopneumonia developed at the right base and left apex.

<i>Examination.</i> —Breast Milk.		Blood.
Fat.....	5.96	Reds 5,200,000
Proteids....	1.88	White 12,000
Sugar.....	6.31	Hemoglobin. .60 per cent.

June 21st.—Dr. L. Emmett Holt, of New York, in consultation. He found as positive symptoms the continued fever for eight weeks, the enlarged spleen and a secondary bronchopneumonia. He excluded syphilis on account of the long pyrexia and failure of the mercurial treatment, and agreed with Drs. Rochester and Snow that the malady was probably tuberculosis.

June 26th.—The spleen reached to the umbilicus; four blackish, bloody stools were passed June 27th.

June 27th.—Child apathetic, weak, diffuse, coarse râles through the right lung, the baby vomited blood, passed numerous bloody stools, dying at 8 P.M. from an intestinal hemorrhage.

AUTOPSY.

Report of autopsy on C. S. Autopsy June 27, 1905, by Dr. N. G. Russell.

Body was that of a child, age three months and twenty-five days. Died June 27, 1905, 11 A.M.

External Appearance.—Usual postmortem lividity, abdomen distended; single pustule on left foot, several on back, head and chest. Abdominal wall has thick layer of fat.

Peritoneal Cavity.—Contains very little fluid.

Pericardium.—Contains one ounce clear serum.

Heart.—Size normal; muscle pale; wall, right side relatively thick.

Lungs.—Show indentations of ribs; both studded in every portion with small yellowish-gray masses, varying in size from a pinhead to a bean.

Lymph Nodes.—Bronchial and mesenteric enlarged and caseous. The pelvic nodes were not enlarged.

Kidneys.—Pale; swollen.

Stomach and Intestines.—The ileum, for about eight inches from ileocecal valve, was firmly fixed in a mass of enlarged lymph nodes. At this point in the ileum is a circular area of ulceration of the mucosa, three-quarters inch in width, compressing the whole calibre of the intestine. Above this point the intestines contain considerable dark blood. There is a small ulcer, one-half inch in diameter, in the stomach at the greater curvature. The colon contains a considerable amount of soft, dark greenish material.

Liver.—Pale, yellowish, studded with small yellowish-gray masses about the size of a bean.

Spleen.—Large, dark, surface and interior studded with small yellowish masses.

Sections from skin (pustule), liver and spleen show typical miliary tubercles. In the caseous masses, tubercle bacilli were found. The liver also shows fatty infiltration. Section of the kidney shows cloudy swelling of the renal epithelium with sound cell infiltration between the tubules.

Anatomical Diagnosis.—Miliary tuberculosis of the lungs, spleen and skin. Caseous lymph nodes (bronchial and mesenteric). Tuberculous ulcer of the ileum. At no point was there the slightest tendency to healing noted by Sterniman.

Smears made from bronchial lymph node show large numbers of tubercle bacilli. Stained smears of milk, from the breasts of Mrs. S., show no tubercle bacilli, but a few micrococci (*staphylococcus albus*).

Animal Experiments with the Mother's Milk.—Two healthy

guinea pigs inoculated with breast milk in peritoneal cavity. Animals appear well; after several weeks they were killed. At autopsy there were no lesions of tuberculosis present in either one. Control animals negative.

The occurrence of tuberculosis in a nursing baby of healthy parentage with no tuberculous heredity is unusual and demands explanation, as the older child probably succumbed to the same cause two months before.

The avenue of infection and the primary lesion were in the digestive tract; the earliest lesion was the circular ulcer of the intestinal mucosa, followed by infection and infiltration of the neighboring mesenteric lymph nodes, whose liquid caseous condition indicated an infection about three months before. (Baumgarten, Vol. I., p. 555.)

Evidently the baby at the age of three or four weeks swallowed virulent tubercle bacilli, which first infected the mucosa of the ileum, next the neighboring lymph nodes, and finally caused a general miliary tuberculosis.

Although there was a huge-girdle ulcer of the ileum, yet for six weeks there was no diarrhea, mucus or bloody stools. During the last few days of life, the stools became frequent and the baby died of a copious terminal hemorrhage, proceeding from the ulcers in the stomach and intestine.

It is also noteworthy that with extensive caseation of the mesenteric nodes and fever for two months there was no emaciation and at the autopsy abundant adipose tissue was present on the body.

SOURCE OF THE INFECTION.

Both children were infected at the end of March, the older child dying quickly, the younger one lingering for two months. There was no tuberculous heredity. The parents, relatives, house servants were well, the nourishment, breast milk, was proven by inoculation experiments to be free of tubercle bacilli.

A trained nurse, Miss W., was in attendance at the second confinement. At the time she was in poor health and coughed frequently. After a month's stay she went home, and about July 1st tubercle bacilli were found in her sputum and tuberculous lesions discovered in her lungs. There can scarcely be a doubt that the nurse infected both babies by prolonged personal contact, either by kissing, sneezing, coughing or breathing in their faces;

the infectious liquid droplet containing tubercle bacilli were swallowed or inhaled. The children received the bacilli in massive and repeated doses. It was also ascertained that a baby that Miss W. had cared for in confinement nine months before had recently died of bronchopneumonia.

The infection of a baby by a tuberculous nurse, mother or attendants we believe to be not uncommon, although proven instances are rare.

Reich (*Berlin. Klin. Woch.*, p. 37, 1878) reports that in a town of 1,300 inhabitants, the obstetric practice was divided between two midwives. Within fourteen months no less than ten infants, who had been delivered by one of these women, died of tuberculous meningitis. In none of the families was there a history of tuberculosis. The midwife was found to be suffering from pulmonary consumption and died of the disease.

It was her custom to remove the mucus from the mouth of the newborn by direct mouth to mouth aspiration and then to establish respiration by blowing into the nose. In the practice of the other midwife no death occurred, although she treated the infants in the same fashion.

Marfan (*Revue de l'Enfance*, October, 1905) saw an infant who, at the age of six months, succumbed to a primary tuberculosis of the mesenteric nodes; the mother, seriously ill with tuberculosis, fed the baby on bottled milk and well-cooked soup. Before offering the foods she cooled them by blowing on them with her breath.

Four hereditarily, untainted children, reported by Demme, died within a short time of primary intestinal tuberculosis (autopsy). The nurse of these children had the habit of trying the heat of the spoon with her lips before feeding porridge to them. Two months after the death of the fourth child, it was discovered the nurse had a lupus of two years' standing on interior part of nasal septum and tuberculosis of the osseous structures around the antrum of Highmore, from which tuberculous pus was voided through a fistula into the mouth.

Concerning the primary lesion of infantile tuberculosis, nearly all authorities assert that primary intestinal tuberculosis is exceedingly rare, and state that the bronchial lymph nodes are first affected. It is, however, interesting to quote the views of

Behring,* supported only by animal experimentation and also affirmed by Klebs, Anfrecht and Orth.

(1) That the digestive tract is the most important avenue of invasion for the tubercle bacillus in infancy, at which period the mucosa is most vulnerable to tubercular infections which may remain latent for months and years.

(2) That the earliest infancy decides the entire future as far as the later development of pulmonary consumption. The frequency of tuberculosis in the first year varies according to different authors from 7 per cent. to 27 per cent.

Botz,	2,576 autopsies,	27.8 per cent.			
Sterniman,	}	591	“	7.1	“ “
Zurich,					
Holt,					
		726	“	8.0	“ “

The largest death rate is from three to six months. Escherich found no healed tuberculous lesions in any child under three years.

Most pathologists state that the most advanced or primary lesion is rarely in the intestinal tract.

Biedert.....	3104 cases	primary lesion intestinal in 16 cases.				
Bouvard, N. Y. Foundling	250	“	“	“	“	5 “
Bouvard, Berlin, R. Koch,	933	“	“	“	“	10 “ } Jahrbuch Kinder-
Escherich.....	401	“	“	“	“	0 “ } heilkunde45,p.1370
Bouvard, London Hospital	748	“	“	“	“	136 “

ARCHIVES OF PEDIATRICS, 1901, p. 8 8.

Secondary tuberculous intestinal ulcerations are, of course, quite common. Heller, in diphtheria autopsies, 714, found as an accidental discovery 20 tuberculous, of which one-third showed primary intestinal tuberculosis.—*Deutsch. Med. Woch.*, p. 39, 1902.

Orth (*Zeitsch. für Heilk. und Infection*, B. 48, H. 2) states that the variation in the frequency of primary intestinal tuberculous lesions is explained by the fact that some communities boil their milk, others do not. He believes in the intercommunicability of bovine and human tuberculosis. He also believes that inhalation tuberculosis may also, primarily, affect the digestive tract.

Heller (*Berlin. Klin. Woch.*, May 16, 1904) found 26

* Behring. *Deutsch. Med. Woch.*, September 24, 1904.

per cent. of primary intestinal tuberculosis in autopsies on tuberculous children, many being from excellent families. He contends the seeming rarity of intestinal primary tuberculosis is due to faulty technique.

Many authorities believe that tubercle bacilli may penetrate the intestinal mucosa without leaving a lesion or trace, and pass into the blood or lymph currents.—*Behring*, Vol. II., p. 443.

DIAGNOSIS.

All clinicians agree that the symptoms of infantile tuberculosis in the early stages are so obscure that a diagnosis is difficult or impossible, and in my case, until the autopsy, the nature of the malady was only a surmise, yet as a matter of fact the case could easily have been diagnosed.

(1) By examining the stools for tubercle bacilli. Until the last few days the stools were normal, but at the autopsy the fecal contents contained tubercle bacilli.

(2) By examining the contents of the skin pustules which contained tubercle bacilli, tuberculous skin pustules being an excessively rare lesion.

Heubner, Vol. I., p. 614, cites an interesting case of chronic skin tuberculosis associated with latent tuberculosis. A child of eighteen months had an ecthyma of 11-12 small pustules grouped together on the left thigh. These skin lesions ulcerated, and after several weeks healed, leaving scars. Soon after the child died of whooping-cough; pneumonia, on autopsy, extensive caseation of the bronchial lymph nodes with scattered tubercles in the lungs was discovered.

The lesson of the little tragedy which emptied a house of children is, that babies may easily be infected with tuberculosis from parents, nurses, or other consumptives, who are with the child, and that the utmost vigilance should be exercised to protect an infant against tuberculous environment.

DISCUSSION.

DR. RACHFORD.—Dr. SNOW's case calls to mind one that I had under observation some twelve years ago—a woman four months in family way who was far advanced in tuberculosis. For a time it was believed that it would be impossible for this pa-

tient to live through her pregnancy, but as time went on it became evident that there was a chance that the woman might go to full term. In the latter months of the pregnancy she developed a laryngeal tuberculosis in addition to the pulmonary disease from which she had previously suffered, and it was with great difficulty that she was kept alive by hypodermic medication until finally the child was born. The mother herself lived only two weeks after the birth of her child. The father, previously to the birth of the child, had said to me that I might make any preparation I thought best for saving the child from tuberculous contagion, so with that end in view a room was selected in the house, which was washed with bichlorid, repapered, and new hangings furnished. On the day the child was born a wet nurse was brought to the house and the baby was carried into the prepared room and left with her, and there remained up to the time of the mother's death. The mother, during the two weeks she lived, saw the child once a day, as it was simply carried into her room and out again. After the mother's death the baby was removed, while the house was thoroughly disinfected. The baby then came back into the house and lived there four or five years. This child is now twelve years old, and has never shown a symptom of tuberculosis. Dr. Snow's case shows the danger of infection from tuberculosis, while this case shows what can be done in the matter of protecting a child from tuberculosis where the physician has absolute control of the circumstances.

DR. NORTHRUP.—In connection with the case just recited by Dr. Rachford, I have one to relate on the other side. The baby was allowed to nurse the breast of the mother without precaution, and in six weeks an autopsy showed cavities in both lungs.

DR. ROTCH.—I should like to ask Dr. Snow if this was a true primary tuberculosis of the intestine, or secondary to the tuberculosis of the mesenteric lymph nodes? It is extremely rare to have primary tuberculosis of the intestinal mucosa. It is almost always secondary to tuberculosis of the mesenteric lymph nodes, even when the bacilli have entered from the intestine. We have only had one case, reported by Dr. Councilman, in which it occurred in a child. It is interesting in connection with tuberculosis of the mesenteric lymph nodes, because of the encouragement offered for operative procedures. We have had cases of that kind where the enlarged glands were discovered and removed. It is encouraging to know that in these cases we may be able to save life by operative interference.

DR. SNOW.—The primary lesion was in the intestinal mucosa. At least we drew that conclusion from the autopsy.

DR. ADAMS.—How do you account for the absence of intestinal symptoms until just before the death of the child? Is it

not a fact that in tuberculous ulcers of the intestine digestive symptoms develop very early? It has been my experience in cases of tuberculosis of the mucosa that symptoms developed quite early, and I am surprised that with an ulcer of that kind in the mucosa of the intestine there were no intestinal symptoms. It is our experience that there is first tuberculosis of the mesenteric lymph nodes.

DR. WESTCOTT.—The case suggests the great facility with which tuberculosis may be communicated by very direct infection to the young infant. Several years ago I reported the case of an infant dying at four months with tuberculosis of the lungs, which apparently had been secondary to extensive involvement of the bronchial glands at the root of the lungs. One of these was quite large, had begun to break down, and had pressed upon the descending vena cava. The child had been breast-fed from birth, and had never had artificial food. It had been delivered in a general hospital, where the mother remained for several weeks in a private room. Symptoms of declining health were not noted until the second month. I did not see the case until a few weeks before death. The probable source of infection was suggested by the mother, who asked whether it would not be possible that the disease might have been communicated in some way from a tuberculous patient who was in the hospital at the time she was confined, occupying a private room on the other side of the hall. There had been no direct communication between this patient and the mother, but nurses had passed between the rooms and had probably attended to the baby after being in attendance upon the tuberculous patient. No other likely source of infection could be traced. The very early date of development of the first symptoms certainly fixed the time of infection very soon after birth.

DR. HOLT.—This case of Dr. Snow's is particularly interesting and valuable because of its completeness. Too often we know only that the nurse was suspicious. She passes from observation and the opportunity of confirming the diagnosis in her case is lost. This case also presents a point of interest in the tuberculous lesions of the skin, something that I think perhaps we are not on the lookout for with a sufficient degree of keenness. This occurs, I believe, more frequently than we are inclined to think. A case of this kind emphasizes the great frequency of tuberculous infection from contagion. In looking for the source of infection in the milk, or somewhere else, we may miss many cases that might possibly have another explanation. One striking point of interest was the prolonged fever without anything local, which in a case of this kind is suspicious.

My observation does not agree with that of Dr. Adams, that these intestinal lesions usually produce distinctive symptoms. Such symptoms usually depend upon the amount of catarrhal in-

flammation. A single ulcer is not likely to produce any symptoms unless we get hemorrhage.

DR. NORTHRUP.—At the Tuberculosis Congress in Washington recently, Dr. Bovaird read a masterly paper on the portal of entry of tuberculous infection. He got together all the statistics available up to this time, and they tended to prove more emphatically than ever before that by far the most common portal of entry was the bronchial lymph nodes. At one time I was interested in a case in the Foundling Hospital where a surgeon was operating on a tuberculous joint and suggested that he take out the lymph nodes as well. It was a humorous remark, but I said sometime we will get a chance to prove that tuberculous infection generally gains entrance through the bronchial lymph nodes. This child developed bronchopneumonia and at autopsy I took out the trachea and bronchi, looked over them carefully and found enlarged lymph nodes. In one autopsy examination I could not at first find the tuberculous nodes, but believed they must be present. I put the whole thing in alcohol to look at at a more convenient time. The next day, in a good light, I took one of my best razors and began cutting sections, and finally took the edge off my razor by cutting into an old calcareous lymph node.

DR. HAMILL.—There is no question that statistics show frequent involvement of the bronchial lymph nodes. Recently it has been determined pretty definitely that the bronchial nodes are not necessarily infected through the medium of the respiratory tract, but that they are infected very frequently through the intestinal tract without producing lesions in the mucosa, or involving the mesenteric lymph nodes. Harbitz, of Christiana, who has written one of the most elaborate theses on tuberculosis of the lymph nodes, makes therein a complete review of the literature, and gives the results of his own investigations in a long series of cases from 1899 to 1905. Having started out with the idea that infection through the intestinal tract was uncommon, he finally reaches the conclusion that it is much more common than has heretofore been supposed, and the longer his studies continue the more he is impressed with this fact. He makes one statement which may in a way account for those infections in early life whose origin is difficult to explain, and that is, that in a large percentage of his cases, where he found no macroscopic nor microscopic involvement of the nodes, he found tubercle bacilli present in the lymph nodes. His statistics are very striking in this regard and he suggests the idea that tuberculosis in the mother, which may not produce discoverable lesions, may be capable of producing tuberculosis in the placenta, and thereby transmitting it to the infant. Dr. Townsend reported a case to this society last year in which there seemed to be great difficulty in tracing the origin of the infection. Some

such explanation as this might throw some light upon the beginning of his case. Harbitz reports the statement of Von Behring that tuberculosis in early life probably remains an undeveloped process through a great many years. He believes that in all human probability the limit of undeveloped tuberculosis, concealed tuberculosis, in early life, is not more than six or eight months, basing his views on the fact that his postmortem examinations of nodes in general showed that between the ages of two and four years it was very uncommon to find concealed forms of tuberculosis, and the percentage of instances in which he found tubercle bacilli without other manifestations of the disease were almost nil. His conclusion from that finding was that the lesions that develop in infant life, and the majority of his cases were infants under one year, very exceptionally existed as concealed forms beyond the second year.

The question of the possibility of infection through the use of infected milk has received much attention of late, and the work which has been done in recent years has seemed to indicate that a great number of cases are infected in this way, a much greater number than we had any idea of. I do not think any one believes milk to be the most common carrier of infection, but we may at least state that the great majority of cases of tuberculosis are infected through the medium of the alimentary tract.

DR. HAND.—I would relate one instance in connection with the possibility of infection from the nurse. A physician brought his child to me last August in the early stage of caries of the spine. We could not find any rigidity or deformity until December, but were sure of the diagnosis from the other symptoms. In March the nurse and child had been out on a windy, dusty day, and had come in with dust in the upper air passages and eyes and with acute colds. The cold subsided in the child, but went on with the nurse to the development of tuberculosis. As soon as this was discovered she abandoned nursing. The child did not show any symptoms until July and I did not see it until August. The lives of nurses and children are so intimately associated during practically twenty-four hours of the day that it is quite possible that they are both subjected to the same outside dangers.

DR. SNOW.—As to the question of the skin lesions, the case was seen by a dermatologist, who said that the papules and pustules were characteristic of congenital syphilis. As to the age of the lesions, the condition of the mesenteric lymph nodes indicated an infection of about three months. We considered the girdle ulcer of the intestine to be the oldest lesion. As to the absence of intestinal symptoms with an ulcer of such size as referred to by Dr. Adams, it is difficult to explain that, but I think it is not unusual to find such ulcers in children who have shown few symptoms of intestinal trouble.

ARCHIVES OF PEDIATRICS.

APRIL, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

Contributors and Correspondents, see page III.

THE BACTERIAL CAUSE OF RHEUMATIC FEVER.

To the Editor of ARCHIVES OF PEDIATRICS:—

DEAR SIR:—The cause of rheumatic fever in acute rheumatism is at present a problem of great interest; and on this account I venture to ask the courtesy of your columns in order to state the position that Dr. Paine and I hold upon this question. I should not have done so if it had not been that recently I came upon a statement in your columns which gave the impression that we were now abandoning our belief that a diplococcus was the exciting bacterial agent in rheumatic fever. Far from this being the case, we feel more convinced now than we were seven years ago,

and I should be obliged if I may put forward some of the points that lead me to make this assertion.

Elaborating and amplifying the pioneer work of such investigators as Mantel, von Leyden, Popoff, Triboulet and Wassermann, in 1900 we stated that a diplococcus was a cause of rheumatic fever, and in 1901 that rheumatic fever was a cause of simple and malignant endocarditis. Later still we made the statement that we *believed* this diplococcus to be the only bacterial cause. Two observers, working together, could never assert that it *is* the only cause, for it is essential that such a statement should be amply confirmed by others. Such confirmation has not yet been satisfactorily obtained, although no one up to the present time has demonstrated the existence of any different infection. Many have, however, failed to discover the diplococcus. Nevertheless, strong support has been received from Drs. Ainley Walker and Beatson in this country, and Dr. Beattie in Scotland, and there has also been some measure of support from America and the continent. Meyers' work in Berlin, valuable and suggestive though it was, is somewhat unconvincing because he failed to find the diplococcus in the local rheumatic lesions. There can be no doubt that a diplococcus can be obtained in pure culture from acute rheumatism, and will produce similar lesions in monkeys and rabbits, and that it has also a remarkable power of attacking the heart and joints. In England certainly no bacteriologist could with any constancy produce by intravenous inoculations heart disease in animals until this microorganism appeared on the scene. This in itself is suggestive when we bear in mind the remarkable tendency of rheumatism to attack the heart. Again, there can be no doubt that the same diplococcus has been found by several observers. Professor Wassermann kindly sent a culture of his diplococcus to Dr. Vernon Shaw, who found it was identical with the one we had supplied him. Drs. Walker and Beattie again found that their diplococcus was indistinguishable from ours; and Dr. Triboulet, when in England, inspected our films and cultures, and at once recognized the organism.

The failure to find the diplococcus depends, in my opinion, greatly upon an imperfect knowledge of the clinical disease, acute rheumatism, as it occurs in man and animals. When a distinguished bacteriologist, who has written an important article adverse to our view of the disease, proclaims in a debate that he has not seen a case of chorea for fifteen years, one is justified, I maintain, in disputing his right to an opinion upon the causation of rheumatism and in attaching no serious importance to his conclusions. Again, the demands that have been made by critics have been exorbitant. We have been asked to show the diplococcus in every case, to produce constant results, and to show the specific nature of the bacterium. Such are the immoderate demands that have been made. Can bacteriologists, I ask, show the gonococcus in every case of gonorrheal arthritis? Can they produce constant results and show the specific nature of the micrococcus? Can they do this, even, in all cases of tuberculosis? We know they cannot, and we do not expect it of them.

With regard to the much abused term "specific," we have never claimed the diplococcus as "specific" except in so far that we believe it to be the only bacterial cause of a specific disease. If the specificity of a micrococcus rests upon the latest laboratory test it appears to me to rest upon about as stable a foundation as the pathognomonic sign in clinical medicine, which is of all things the most treacherous. If, however, it rests upon the power of a microorganism isolated from rheumatic lesions to produce cardiac and other manifestations in animals similar to those from which it was isolated in man, then this micrococcus is probably specific. I am not myself convinced that a specific disease of bacterial origin implies that the bacterium will show a specific test to laboratory methods, for it is possible that such a bacterium may only develop specific poisons in living tissues. It is not probable that the diplococcus will be *demonstrated* in all cases of acute rheumatism, or even of what is termed fatal rheumatism. If we picture a case of acute arthritic rheumatism with the diplococci deposited, as they necessarily must be at first, in the synovial tissues, if we

remember the ease with which an arthritic exudation is produced (in some cases a bacteria-free antitoxin sufficing), and when we recall the benign course of rheumatic arthritis, it is not surprising that the exudation is generally sterile. It is not surprising, either, that cultures from the blood are generally negative. For in how many cases of acute tubercular rheumatism would the tubercle bacillus be isolated from the general circulation? I venture to think from very few. Seeing that the diplococcus produces essentially *local* lesions and that rheumatic septicemia is very rare, the failure to isolate it from the blood in an ordinary attack of acute rheumatism is no proof of its non-existence in the tissues, but is a proof that it is not an easy micrococcus to get at (which is certainly true).

These are not plausible explanations for getting rid of admitted difficulties; they are facts which can be ascertained by experiment. The early arthritic exudations produced experimentally by intravenous inoculations are repeatedly sterile and, more curious still, the blood in the left ventricle may be sterile and yet there be vegetations on the mitral valve containing numerous diplococci. For in so-called fatal rheumatism, death often results from secondary complications. A child is dead, for example, from cardiac rheumatism. The postmortem discloses an adherent pericardium and an old mitral lesion. This child has died from the scars of rheumatism and one's chance of success of isolating the diplococcus is about as great as that of isolating the tubercle bacillus from a case of intestinal obstruction due to a stricture from a scarred tubercular ulceration of the bowel. Lastly, there is a great natural resistance to the rheumatic infection, and even in acute cases the diplococcus, though visible in the films of an exudation, may grow very feebly on cultivation, or not at all.

Some bacteriologists, admitting the presence of the diplococcus, hold it to be a terminal infection. My answer is that, among other examples, there is a man in active employment, from whose blood Dr. Paine, six years ago, isolated the diplococcus during a very severe attack of rheumatic pericarditis.

Interesting and valuable work has been done with micrococci obtained from *non-rheumatic* conditions, which show that these may also produce arthritis and endocarditis. I cannot see what bearing this has on the point at issue, but can only interpret such results as confirmation of the well-known truth that there are manifold causes of arthritis and endocarditis. It is difficult to explain away the two facts that clinicians most acquainted with acute rheumatism have for many years placed it among the so-called septic infections and that a micrococcus belonging to that group can be isolated from the *rheumatic lesions*, and can reproduce them.

I am sir,

Yours truly,

F. J. POYNTON.

London, March 10, 1907.

Bibliography.

The International Medical Annual: A Year Book of Treatment, and Practitioner's Index. By thirty-five contributors, English and American. Twenty-fifth year. Pp. xi.-644. Illustrated with 28 plates and 60 diagrams. Price, \$3.00. New York: E. B. Treat & Co., 1907.

The International Medical Manual follows its usual custom of giving a general review of Therapeutic progress during the year, followed by a dictionary of Newer Remedies, a discussion of Serum-Therapy and a chapter on Opsonins and Vaccine Inoculations. As in the issue of 1906 there is also a chapter on Electro- and Radio-Therapy, and after this a dictionary of Treatment, which comprises the bulk of the volume. This is alphabetically arranged, and its contributors are authoritative upon the subjects presented.

Dr. G. F. Still, of London, writes upon most of the topics relating to the treatment of Children's Diseases and Diet. This is a guarantee of the soundness and timeliness of their presentation. Especially valuable sections are those upon the Opsonins and the Inflammations: in the latter is presented a full discussion of Bier's treatment of inflammations by inducing local hyperemia.

The plates and illustrations are numerous and excellent, and the book is well bound. The volume maintains the usual high standard, and is of great value for ready reference.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. SAMUEL W. THURBER.
DR. HENRY HAIMAN.
DR. V. AGOSTINI.

DR. L. C. AGER.
DR. G. R. PISEK
DR. ALFRED F. HESS.

PATHOLOGY.

Turner, A. Logan: Congenital Laryngeal Stridor. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 807.)

After discussing the symptoms of this affection, the author takes up what seem to him the four most plausible explanations of the cause of congenital stridor.

(1) Adenoid vegetations.—Stridor caused both by the size of the growth and the nervous irritation due to the presence of adenoids and to the secretions attending them. However, the author says that adenoids are very seldom met with in true congenital stridor which does not produce attacks of suffocation and nasal occlusion so often seen where there are large adenoids.

(2) Compression of the trachea by an enlarged gland.—Evidence shows that an enlarged thymus can compress the trachea and produce respiratory difficulty. A small number of cases have been relieved by operation upon the thymus. The author, in an analysis of 10 published cases of fatal congenital stridor, says in only one of them was the thymus stated to be enlarged, and in it there was no evidence of compression. Thus he is unable to accept this theory as put forth by Avellis and Hochsinger.

(3) Congenital malformation of the upper aperture of the larynx.—According to Sutherland and Lack, the epiglottis may be sharply folded upon itself and the aryteno-epiglottidean folds so closely approximated that the upper aperture of the larynx is narrowed to a mere slit. The flaccidity of these parts when sucked in produces obstruction and stridor. As the child grows and the parts become less flaccid, the condition gradually wears off.

(4) An acquired deformity of the upper aperture of the larynx, the result of a disturbance of the co-ordination of the respiratory movements.—John Thomson and Turner are both inclined to hold this view, and say that as a result of the ill-co-ordinated and spasmodic nature of the breathing, there is constant sucking in of the soft and yielding structures about the upper aperture of the larynx. A series of experiments was per-

formed on infantile larynges by sucking air forcibly through a tube to represent the trachea. The resulting deformities of the upper aperture closely resembled those in the postmortem findings of some fatal cases described by several observers. Finally, Logan believes that the stridor is produced mainly by the abnormally approximated aryteno-epiglottidean folds.

SAMUEL W. THURBER.

Koepe, Hans: Green Stools and Ferment Action. (*Monatssch. für Kinderheilk.*, November, 1906, p. 430.)

The author found that the addition of hydrogen peroxide to the stool produced in many cases a green discoloration, differing in no respect from the ordinary green stools of infants. The author thinks that there are three factors involved in the production of green stools, namely:—

- (1) A peroxide.
- (2) A ferment causing the reduction of the peroxide.
- (3) A pigment which on oxidation (the oxygen being furnished by the reduction of the peroxide) becomes green.

HENRY HEIMAN.

MEDICINE.

Pagano, Raffaele: Experimental Contribution Concerning the Pathogenesis of Infantile Atrophy. (*La Pediatria*, September, 1906, p. 641.)

The author publishes a series of experiments done with puppies and consisting in recording their weights and examining their excreta; firstly, under normal feeding, then with scanty food, and lastly with inadequate and altered food. He observes: the steady loss of weight; the gastrointestinal disturbances and the increased putrefactive processes as indicated by inoculations of rabbits with the extracts of feces and by determination of the amount of sulphuric ether in the urine (Salkowski's method); and later finds the gradual development of an atrophic state and the signs of rachitis with the swelling of the various bones, particularly those of the thorax, anterior limbs, etc. Dr. Pagano decides that it is the scanty and incongruous kind of food which acts as the main factor in the production of infantile atrophy. There is a derangement of the gastrointestinal functions which

gives rise to the processes of fermentation and putrefaction, and to the formation of organic poisons which are absorbed and produce a state of profound intoxication of the organism. He also infers from his experiments that this intoxication is greater when the food is abundant, but incongruous or altered, as there is then a proportionally greater production of toxic substances; and finally concludes that in primary or idiopathic atrophy there is no alteration of the gastrointestinal mucous membrane, but that the pathogenesis of the malady lies in the processes of intoxication of intestinal origin and is occasioned by the insufficient, inadequate or altered food administered.

V. AGOSTINI.

Fischl, Rudolf: Acetonemic Vomiting and Infantile Hysteria. (*Revue Mens. des Mal. de l'Enfance*, July, 1906, p. 289.)

In reviewing the literature of cyclic vomiting for Schlossmann and Pfaundler's new "*Traité de Pédiatrie*," the author has reached an opinion as to the etiology of cyclic vomiting which is directly opposed to the beliefs of most pediatricists. He is strongly convinced that these attacks are merely nervous explosions of hysteria excited by some slight gastrointestinal disturbance. He gives his reasons for this belief as follows: The cases are found almost exclusively among the leisure classes, which furnish also most of the cases of hysteria. Many observers have called attention to the fact that these patients belong to neurotic families, the other members of which present their hysteria in various ways. The symptoms of the attacks are themselves highly suggestive of hysteria—the sudden, violent onset, and the equally sudden cessation and immediate return to a healthy state—are unlike the manifestations of other gastric diseases. Finally the successful cures recorded by the administration of widely differing drugs of slight or doubtful efficacy, and M. Broca's cures by appendectomy point strongly to cure by suggestion only.

The fact that has prevented many authors from accepting the theory of hysterical cause has been the acetonuria so constantly present. The author, however, draws attention to the fact that acetonuria is not a rare condition in hysteria whenever there is any gastrointestinal disturbance. Three cases are recorded in detail in support of the writer's position.

[NOTE: The symptoms of acetonuria and acetonemia are in need of very careful investigation by pediatricists. The more carefully they are investigated the more frequently are they found, and we are forced to the conclusion that they are due to various forms of tissue waste. "One is liable to meet with an increase in acetone in the urine whenever the proteid waste of the organism is abnormally large."—HERTER, *Chemical Pathology*, p. 438.]

L. C. AGER.

Hunt, J. G.: Report of a Case of Hematemesis Complicating Malaria. (*The Post-Graduate*, November, 1906. p. 1,065.)

Since a careful review of the literature failed to reveal any reference to malaria as a direct etiologic factor in hematemesis, Hunt believes a report of his case will prove of considerable interest, if it is accepted that the causal relationship of the malarial infection to the hemorrhages is correct.

The patient was a boy of eleven years. The history obtained had no bearing on this trouble. The present illness dates from a visit to New Jersey, three months before admission to hospital. The first indication of malaria occurred six days before admission, when the patient had a severe chill, followed by high fever and sweating. The following day the patient had a violent hematemesis with the loss approximately of "a quart of bright red blood." The second hematemesis occurred two hours after admission, 15 to 20 ounces of bright red blood being lost, accompanied by severe cramping pains in the epigastrium. Physical examination of abdomen was negative. Blood examination showed Hb. 26 per cent., red blood corpuscles, 2,200,000, leukocytes, 13,600. The differential count showed 54 per cent. mononuclears and the presence of the Tertian Plasmodium. A third and last hematemesis, of about 10 ounces of dark fluid occurred next day. The treatment was with adrenalin, morphin, saline intravenously, and saline per rectum, containing 30 grains of calcium chlorid. The boy made a complete recovery, leaving the hospital in about a month.

The reporter believes the special pathologic changes were thromboses of the smaller gastric and intestinal vessels, with resulting necroses and ulcerations, such as have been reported by Italian writers in malignant estivo-autumnal infection.

G. R. PISEK

SURGERY.

Pease, C. A.: Tetanus, with Special Reference to Fourth of July Injuries. (*Vermont Medical Monthly*, November 15, 1906, p. 244.)

The author has made a series of interesting experiments with blank cartridges and by inoculations, in order to determine if possible wherein the tetanus bacilli are lodged. In all twenty-two blank cartridges were examined, with comparatively positive results in one case. Pease says it is an interesting fact that, if the spores of tetanus are introduced into the body, freed of their poison, they are usually promptly destroyed by the phagocytes. However, if this is not done, the spores would develop bacilli and begin to manufacture toxin and produce the disease. This suggests that many wounds may be infected with tetanus bacilli, but surrounding conditions rarely enable them to develop toxin enough to cause the disease. The period of incubation is three to fourteen days, and this period is shorter in small boys—five to nine days. The prognosis in cases developing within nine days being unfavorable. After that time there is a better outlook.

In conclusion he says it would seem that the spores of tetanus bacilli are far more common than generally supposed; that the mortality with the use of tetanus antitoxin is about 43 per cent., while in acute cases it is nearly 63 per cent. He urges strongly that all wounds liable to infection by the tetanus bacilli, and especially blank cartridge wounds, be treated at once in a thoroughly antiseptic manner, and immunizing doses of at least 10 c.c. of tetanus antitoxin be injected around the seat of the injury.

G. R. PISEK.

Guinon, M.: Enteritis and Appendicitis in the Infant. (*Revue Mens. des Mal. de l'Enfance*, August, 1906, p. 337.)

This is another contribution to the very active discussion going on in the French Academy, one side claiming that appendicitis does not occur in the course of mucomembranous colitis, the other insisting that colitis is a frequent cause of appendicitis.

The author expresses his astonishment at the fact that there was no pediatricist to rise in the Academy and declare that whatever might be true of adults there is certainly no such antagonism in children. According to his belief there is no appendicitis in

children without an enteritis, and when a colitis is localized in the cecum there is usually an appendicitis. Various authors are quoted to fortify this proposition and 29 personal cases are reviewed. The conclusions drawn are summed up as follows:

(1) The most frequent cause of appendicitis in children is an acute, subacute, or chronic mucous enterocolitis.

(2) That the enteritis is in turn often the result of acute or chronic adenoiditis.

(3) That the adenoiditis and the enteritis are intermediary steps between grippe and appendicitis.

(4) These beliefs lead to the conclusion that thorough removal of adenoids and care of the digestive tract will prevent appendicitis and possibly cure it.

L. C. AGER.

Ellis, H. Bert: Infective Sigmoid Sinus Thrombosis.
(*Annals of Otology, Rhinology and Laryngology*, September, 1906, p. 461.)

C. W. Richardson, in the discussion of this paper, cites 2 cases in which a sinus thrombosis might have been expected, and which would illustrate the difficulty in always making a definite diagnosis of this lesion.

The first, in a child of nine years, who had had a chronic suppuration from the ear and was then in convulsions and had a temperature of 105° . Immediate operation revealed an extradural abscess with noninvolvement of the sinus.

The second, in a child of two years, who had been running a temperature for several days with no apparent cause. For five days the temperature ran from 99° to 105° each day. Operation showed a typical osteomyelitis of the mastoid, where there had been no tenderness or other mastoid symptoms. The sinus was normal.

E. W. Day, in discussing this same paper, showed three charts of cases with apparent mastoid involvement following measles. In the last both mastoids were opened and pus found, but the patient still remained in bad condition and sinus involvement was suspected, but a postmortem revealed a pneumonia.

E. B. Dench, in this same discussion, cited the case of a child eighteen months old, for whom he was consulted for an unexplained temperature. No tenderness over the mastoid, but there

was swelling of the canal. The mastoid was opened and pus found. Forty-eight hours after this the sinus was opened and a large clot found. After this the temperature began to fall. However, the whole jugular was found to have been infected and the patient died of sepsis.

SAMUEL W. THURBER.

HYGIENE AND THERAPEUTICS.

Mulder, G. H.: Examination of Stuttering Among the School Children in the Netherlands. (*Annals of Otology, Rhinology and Laryngology*, September, 1906, p. 594.)

This reports the results of an investigation by a committee of the Netherlands Laryngological, Rhinological and Otological Society of 68,914 school children. Seven hundred and forty-five were stutterers—599 boys and 146 girls. Mulder considers this difference favors an hereditary explanation. Stuttering began in most of the cases before the sixth year. In 216 cases more than one child in a family was affected. Two hundred and twenty-one of the children suffered from nasal obstruction of different kinds, some 40 per cent. being adenoids. In a large majority, a distinct nervous predisposition can be demonstrated. A high per cent. of backward children is found among stutterers.

SAMUEL W. THURBER.

Wolf, W.: The Pathogenesis and Therapeutics of Infantile Splenic Anemia. (*Berlin. Klin. Woch.*, December 3, 1906, p. 1,565.)

The disease occurs most frequently between the ages of six months and three years. It rarely occurs in breast-fed infants. Digestive disturbances are present in nearly all cases. The blood presents the following characteristics:

Considerable diminution in the red blood corpuscles and hemoglobin (3 to 3,500,000). Considerable poikilocytosis. Normoblasts are usually present, while polychromatophilia is always present. Moderate leukocytosis (15 to 24,000). Slight eosinophilia.

The author reports a typical case in which the red blood cells numbered 467,000 to the cubic millimetre. After the removal of the spleen, which weighed 500 grams, there was a marked improvement in the character of the blood and considerable gain in

weight. He considers the disease due to a primary affection of the spleen, and advises the removal of the organ in severe cases.

HENRY HEIMAN.

Escherich, Theodor: The Use of Pyozyanase in the Treatment of Epidemic Grippe in Infants and in Cerebrospinal Meningitis. (*Wiener Klin. Woch.*, June, 1906, p. 751.)

Escherich reports experiments with pyozyanase, an antiseptic prepared by means of autolysis from the bacillus pyocyaneus, and sold by the Lingner laboratory of Dresden. He first tried its local action against the diphtheria bacillus, but did not find it of great value. In an epidemic of grippe, however, which the author believes to have been caused by Pfeiffer's micrococcus catarrhalis, as these were very numerous in the nasal secretion, Escherich had better success. As soon as 5 drops of pyozyanase were instilled into each nostril the disease disappeared, and the bacteria were no longer present in the nasal secretion. Experiments with pure cultures showed a special affinity of the antiseptic toward the micrococcus catarrhalis.

As the meningococcus biologically is closely related to the micrococcus catarrhalis, it seemed as if we might expect pyozyanase to have some action also upon this organism. This would be of great therapeutic value, as we know that the meningococcus in many instances gains access to the meninges from the nose or nasopharynx, and also that healthy individuals often harbor this microorganism and thus serve as propagators of infection. First, however, 3-5 c.c. of the fluid was employed in intradural spinal injections in cases of cerebrospinal meningitis. It did not show a curative effect, although following its use the cocci were greatly diminished in number. In a few instances it produced irritation and even collapse. It was next employed as a disinfectant for the nose and nasopharynx. To this end 5-20 drops of the undiluted fluid, or even 1-2 c.c. in the case of older children and adults, was sprayed into each nostril. Following even one careful application the meningococci were generally found to have been eradicated. Escherich, therefore, recommends pyozyanase administered in this manner in all cases of meningococcus meningitis, and also that, as a prophylactic measure, the spray should be used in the case of all persons who come in contact with individuals suffering from this form of meningitis.

ALFRED F. HESS.

ARCHIVES OF PEDIATRICS.

Vol. XXIV.]

MAY, 1907.

[No. 5.

Original Communications.

THE WEIGHT OF BREAST-FED INFANTS DURING THE FIRST TWO WEEKS OF LIFE.*

BY J. P. CROZER GRIFFITH, M.D.,

AND

J. CLAXTON GITTINGS, M.D.,

Philadelphia.

The initial weight of infants and its variation during the first weeks of life have been studied by various writers. Some of the results were reported in a former publication by one of us (*New York Medical Journal*, March 4, 1899) in which, however, was specially considered the growth of children throughout the entire first two years of life. Inasmuch as decided differences exist between published statistics, especially for the first weeks of life, we have thought it well to review in some detail what has been written, and to add some investigations of our own. These investigations have been made entirely at the Preston Retreat, in Philadelphia, under the charge of Dr. Richard C. Norris, whose kindness and constant supervision have rendered the study possible, and to whom we wish here to express our thanks. This institution receives only married women from the working classes.

We may divide the subject into:—

- A. The birth weight and the causes influencing it.
- B. Loss and gain in weight in the first two weeks of life and the influences which affect them.
- C. Is the initial loss physiological?

A. The Birth Weight of Infants.

There exist now a large number of observations regarding the initial weight of healthy full-term infants. Some of the more important of these may be summarized as follows:—

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 30, 1906.

Investigator.	Number of Cases	Average Weight.		Number of Boys.	Average Weight.		Number of Girls.	Average Weight.	
Schaeffer (1)	20	3085	grams (6 lbs. 12.75 oz.)	6	3258	grams (7 lbs. 2.80 oz.)	14	3011	grams (6 lbs. 10.15 oz.)
"	74	3169	" (6 lbs. 15.75 oz.)	39	3163	" (6 lbs. 15.5 oz.)	35	3177	" (6 lbs. 15.98 oz.)
Hecker (17)	4449	3279.35	" (7 lbs. 3.60 oz.)	2295	3339.72	" (7 lbs. 5.72 oz.)	2154	3215.14	" (7 lbs. 1.28 oz.)
Kezmaraky (3)	73	3329.8	" (7 lbs. 5.37 oz.)	34	3382.8	" (7 lbs. 7.25 oz.)	39	3283.7	" (7 lbs. 7.75 oz.)
Ingerslev (20)	3450	3 33	" (7 lbs. 5.48 oz.)	?	3380	" (7 lbs. 7.15 oz.)	?	3280	" (7 lbs. 7.60 oz.)
Gregory (2)	45	3335	" (7 lbs. 6.20 oz.)	?	3386	" (7 lbs. 7.33 oz.)	?	3331	" (7 lbs. 4.5 oz.)
Camerer (12)	119	3433	" (7 lbs. 9. oz.)	62	3456	" (7 lbs. 9.33 oz.)	54	3250	" (7 lbs. 2.5 oz.)
Altherr (10)	480	to { 2500 3500	" to { (5 lbs. 8.20 oz.) (7 lbs. 11.33 oz.)	?	3214	" (7 lbs. 1.25 oz.)	?	3077	" (6 lbs. 12.66 oz.)
Schaeffer (1)	315	3100	" (6 lbs. 13.25 oz.)						
"	100	3105	" (6 lbs. 13.40 oz.)						
Bouchaud (19)	54	3250	" (7 lbs. 2.50 oz.)						
Holt (22)	1158	3330	" (7 lbs. 5.38 oz.)						
Peterson (28)	1675	3527	" (7 lbs. 12.66 oz.)						
Winckel (5)				56	2527.2	" (5 lbs. 8 oz.)	44	2423.6	" (5 lbs. 5.33 oz.)
Haake (4)				100	3899.95	" (8 lbs. 8.9 oz.)	100	3794.96	" (8 lbs. 5.66 oz.)
Griffith & Gittings	225	3455.79	" (7 lbs. 9.9 oz.)	111	3494.06	" (7 lbs. 11.25 oz.)	115	3418.08	" (7 lbs. 8.57 oz.)

Our own observations are based upon weighings of children apparently normal and not premature. They are as follows:—

Total Number of Infants, 226	Average Initial Weight 7 lbs. 9.9 oz. (3455.79 grams)
Males..... 111	“ “ “ 7 lbs. 11.25 oz. (3494.06 “)
Females..... 115	“ “ “ 7 lbs. 8.57 oz. (3418.08 “)

Combining our figures with those of the investigators quoted, it will be seen that *a fairly average birth weight may be considered to be 7 pounds, 8 ounces (3,401.92 grams); males equaling 7 pounds, 10 ounces (3,458.67 grams), and females 7 pounds, 6 ounces (3,345.22 grams), with an average difference between the sexes of 4 ounces (113.40 grams). The initial weight may vary considerably within normal limits, and infants weighing from 6 to 9 pounds (2,721.54 to 4,082.33 grams) may properly be considered normal.*

Influences Affecting the Birth Weight.

Apart from the sex of the child, already referred to, a number of other factors must be considered.

I. AGE OF THE MOTHER.

The influence of this is not always clear, inasmuch as it is often combined with that of the number of pregnancies, these naturally being generally greater the older the woman.

Matthews Duncan²³ believes that the age of the mother exerts a much greater influence on the development of the fetus than does the number of previous births. He concludes that the largest children are born between the twenty-fifth and the twenty-ninth years, and at this time weigh from 7 pounds, 3.15 ounces (3,264.43 grams) to 7 pounds, 5.59 ounces (3,333.60 grams). Before and after this period the weight is less, averaging 6 pounds, 15.74 ounces (3,167.76 grams) for children born of mothers between fifteen and nineteen years, and 6 pounds 14.66 ounces (3,137.14 grams) when the mothers are between forty-five and forty-nine years of age.

Kleinwächter²¹ found that the birth weight of children born of mothers between sixteen and nineteen years of age was 3,274.05 grams (7 pounds, 3.40 ounces), between the twentieth and twenty-ninth years 3,220 grams (7 pounds, 1.5 ounces), and between the thirtieth and forty-first years 3,162.52 grams (6 pounds, 15.47 ounces).

Fleischmann¹⁰ gives the following figures based upon the statistics of a number of observers:—

AGE OF THE MOTHER.	WEIGHT OF THE CHILD.
15-19 years	3,241 grams (7 pounds, 2.24 ounces)
20-24 "	3,299 " (7 " 4.28 ")
25-29 "	3,342 " (7 " 5.80 ")
30-34 "	3,375 " (7 " 6.97 ")
35-39 "	3,428 " (7 " 8.83 ")
40-44 "	3,326 " (7 " 5.24 ")

Schaeffer¹ found that the average weight of infants of ten mothers from sixteen to nineteen years of age was 2,866 grams (6 pounds, 5.11 ounces), and of the infants of thirteen mothers from thirty to thirty-nine years of age 3,332 grams (7 pounds, 5.10 ounces).

Hecker¹⁷ gives the influence of the age of the mother in 4,449 cases as follows:—

AGE OF MOTHER.	NUMBER OF CASES.	AVERAGE WEIGHT.
15-19 years	124	3,169.909 grams (6 pounds, 15.75 ounces)
20-24 "	1,321	3,229.845 " (7 " 1.84 ")
25-29 "	1,551	3,283.081 " (7 " 3.66 ")
30-34 "	945	3,327.748 " (7 " 5.5 ")
35-39 "	410	3,337.194 " (7 " 5.75 ")
40-44 "	91	3,339.865 " (7 " 5.80 ")
45-49 "	7	3,035.714 " (6 " 10.99 ")

On the other hand, Fourmann,⁷ basing his studies upon 1,323 cases from the Bonn Frauenklinik, concludes that the influence of the age of the mother upon the weight of the child is very small.

Our own results as to influence of age of mother are as follows:—

AGE OF MOTHER.	NUMBER OF CASES.	AVERAGE WEIGHT OF CHILD.
Between 17-19 years	15	7 pounds, 3.84 ounces (3,283.98 grams)
" 20-24 "	76	7 " 3.75 " (3,281.44 ")
" 25-29 "	63	7 " 13.76 " (3,565.22 ")
" 30-34 "	47	7 " 4.97 " (3,316.02 ")
" 35-39 "	19	7 " 8.35 " (3,411.85 ")
" 40-44 "	6	7 " 14.27 " (3,579.68 ")

Our figures confirm Duncan's statement that the heaviest in-

infants are born of mothers between twenty-five and twenty-nine years of age. How much this excess of weight depends upon the number of pregnancies, and to what extent upon the age, we have not been able to determine. The small number of mothers who bore children after the fortieth year impairs the value of the result for that period.

II. THE NUMBER OF PREGNANCIES.

The influence of the number of pregnancies upon the weight of the newborn infant is generally admitted. For the reasons already stated, accurate conclusions are interfered with by the simultaneous influence of the age of the mother, which is naturally so often operative.

The average excess weight of the children of multiparæ over firstborn infants is stated by Gassner¹⁰ to be 104 grams (3.67 ounces); Wiedenmüller,²⁴ 150 grams (5.28 ounces); d'Outrepont²⁵ and C. Martin,⁷ each 144 grams (5.08 ounces); Spiegelberg and Altherr,⁷ each 120 grams (4.23 ounces); Veit,⁷ 109 grams (3.85 ounces); Ingerslev²⁰, 158 grams (5.57 ounces); Hecker¹⁷, 140 grams (4.94 ounces).

Hecker places the average weight of the first child at 3,201 grams (7 pounds, .83 ounces); the second, 3,330 grams (7 pounds, 4.5 ounces); the third, 3,353 grams (7 pounds, 6.19 ounces); the fourth, 3,360 grams (7 pounds, 6.44 ounces). The gain in weight continues up to the sixth child. He claims that variations in the regularity of increase depend upon the preponderance of boys over girls, or vice versa, in different series of cases.

Ahlfeld²⁶ states that the weight increases up to the seventh or eighth birth, and thereafter becomes less.

Kleinwächter²⁷ asserts that the children of multiparæ will be heavier the longer the pause that has occurred between births. In intervals lasting from one to five years the average weight of the child is 3,284.5 grams (7 pounds, 3.77 ounces), while in intervals from ten to sixteen years the weight averages 3,296.11 grams (7 pounds, 4.18 ounces).

Fourmann observes that the reported instances of extraordinary development occur only in the children of multiparæ. He publishes the following table as a result of the study of his 1,323 cases, none of them of unusual weight:—

Children of 1 paræ weigh	3,215.458	grams	(7 pounds, 1.34 ounces)
" " 2 " "	3,355.352	"	(7 " 6.27 ")
" " 3 " "	3,427.082	"	(7 " 8.80 ")
" " 4 " "	3,447.5	"	(7 " 9.52 ")
" " 5 " "	3,505.74	"	(7 " 11.58 ")
" " 6 " "	3,655.55	"	(8 " 0.86 ")
" " 7 " "	3,670.	"	(8 " 1.37 ")
" " 8 and more	3,900.833	"	(8 " 9.52 ")

He concludes, therefore, that the child is the heavier the greater the number of pregnancies of the mother, and that the average increase for each pregnancy is about 75.833 grams (2.68 ounces).

Fleischmann's conclusions regarding the influence of the number of pregnancies are as follows. These are based upon the study of published statistics:—

1st pregnancy	1,723 cases	3,254	grams	(7 pounds, 2.70 ounces)
2d	" 986	" 3,391	"	(7 " 7.53 ")
3d	" 365	" 3,400	"	(7 " 7.85 ")
4th	" 145	" 3,424	"	(7 " 8.69 ")
5th	" 231	" 3,500	"	(7 " 11.38 ")

In a study of 400 newborn infants Longridge¹⁸ observed the following differences in favor of multiparous mothers:—

PRIMIPARÆ.

MULTIPARÆ.

100 male infants weighed

6 lbs., 15.75 oz. (3,568.06 gms.) 7 lbs., 6.25 oz. (3,752.33 gms.)

100 female infants weighed

6 lbs., 11.75 oz. (3,454.66 gms.) 6 lbs., 14.5 oz. (3,532.63 gms.)

Matthew Duncan found that children of the first three pregnancies average from 7 pounds, 3.15 ounces (3,264.43 grams) to 7 pounds, 5.59 ounces (3,333.60 grams), while for the fifth pregnancy they average 7 pounds, 7.22 ounces (3,379.81 grams). He is inclined, however, as we have said, to attribute these differences rather to the age of the mother than to the number of pregnancies.

Hecker compiles the following table from his observations upon 4,449 cases:—

	I. Paræ.	II. Paræ.	III. Paræ.	IV. Paræ.	V. Paræ.
Av. Wgt. of Child,	3182.512 grams	3315.635 grams	3342.688 grams	3327.567 grams	3413.70 grams
	(7 lbs. 0.17 oz.)	(7 lbs. 4.87 oz.)	(7 lbs. 5.82 oz.)	(7 lbs. 5.29 oz.)	(7 lbs. 8.33 oz.)
Av. Age of Mother,	24.357 years.	27.525 years.	30.019 years.	32.120 years.	35.517 years.

Our own observations on the influence of the number of pregnancies were made upon 226 cases. The average weight of the children of sixty-eight primiparæ was 6 pounds, 14.37 ounces (3,128.92 grams), and of 158 multiparæ, 7 pounds, 10.72 ounces (3,479.04 grams).

From a combination of our own observations with those of others the *general conclusion may be drawn that a greater birth weight is to be expected in the children of multiparæ as compared with those of primiparæ. The difference ranges from 2 to 12 ounces (56.70 grams to 340.20 grams).*

III. GENERAL CONDITION AND DISEASES OF THE MOTHER.

Fourmann found that an important factor influencing the weight of the infant was the general condition of maternal robustness and strength. In a series of selected cases where the mothers were healthy and the pregnancy of normal length, 139 robust mothers gave birth to children of an average weight of 3,335.772 grams (7 pounds, 5.68 ounces), while 39 less robust mothers bore children averaging 2,995.387 grams (6 pounds, 9.66 ounces). Gassner¹⁶ gives the following figures:—

WEIGHT OF THE MOTHER.	NUMBER OF CASES.	AVERAGE WEIGHT OF THE CHILD.
80-75.5 kilograms (176½-166½ lbs.)	6	3,677 gms. (8lbs., 1.62 oz.)
75-70.5 " (165½-155½ ")	27	3,541 " (7 " 12.82 ")
70-65.5 " (154½-144½ ")	49	3,416 " (7 " 8.41 ")
65-60.5 " (143½-133½ ")	70	3,260 " (7 " 2.91 ")
60-55.5 " (132½-122½ ")	56	3,203 " (7 " 0.90 ")
55-50.5 " (121½-111½ ")	23	2,995 " (6 " 9.66 ")
50-45.5 " (110½-100½ ")	7	2,835 " (6 " 4.01 ")

Neither Fourmann nor Gassner allow for the influence of the mother's age or of the number of the pregnancies upon the weight of the child.

Schaeffer makes the general statement that the greater the weight of the mother the greater will be the weight of the child, and that race, too, exerts an influence.

Prominent among the many diseased conditions of the mother which will seriously affect the weight of the child, are excessive vomiting of pregnancy, and tuberculosis or syphilis in an active state. Syphilis of the mother which is apparently cured may not depress the initial weight of the child, even though the latter ex-

hibits manifestations of the disease later in life. Intestinal disturbances of the mother before labor, hemorrhages from any source and abnormalities in the placental circulation may also diminish the initial birth weight.

We can record no observations of our own on this point. *There seems to be no reason to doubt that, in general, the robustness and health of the mother may affect the initial weight of the infant.*

The coincident influence of the age, weight and number of pregnancies of the mother upon the infant's weight can only be differentiated by the study of a large number of cases divided into classes which show approximate equality in these factors. Such observations have not yet been made.

B. Average Loss and Gain in Weight During the First Two Weeks.

Regarding the alteration in weight during the first two weeks of life very much less has been written than upon the initial birth weight. One of the earliest studies with which we are acquainted is that of Siebold,¹⁴ published in 1860, and based upon the weighings of 49 children during the first week of life. Thirty-five of these lost in the first few days, 14 remained stationary. In no instance was there any gain in weight during this period. His figures are not given at length, and no definite mention is made of illness or the nature of the food of the infant.

Haake⁴ made observations upon the weight of 100 healthy, full-term, breast-fed children—59 boys and 41 girls. The daily weighings were made at 9 A.M. All children were weighed immediately after birth. If born between 9 A.M. and midnight, they had their second weighing at 9 A.M. on the following day. If born between midnight and 9 A.M., their second weighing did not occur until the succeeding day; that is to say, no two weighings were made on the same day of the month. The average loss in the first twenty-four hours equalled 202.70 grams (7.15 ounces).

Winckel⁵ published the systematic daily weighings of 100 children (56 boys and 44 girls). Of this number, however, some were premature, some ill and some artificially or insufficiently fed. In the remaining 60 healthy full-term, breast-fed infants he found an average gain over lowest weight within ten days of 231.8 grams (8.18 ounces).

Gregory² recorded careful observations upon 33 full-term

children (12 boys and 21 girls). Each case was weighed directly after birth, and, after that, twice daily until its discharge from the hospital, which occurred usually on the eighth day. Unfortunately, 8 of the 33 cases were ill with enteric disorders, so that the amount of weight gained cannot be considered to represent that of the normal child.

Kezmarsky³ published two sets of figures. In the first class 32 of the infants were weighed twice daily, between 8 and 9 A.M. and between 6 and 7 P.M. In the second class 41 infants were weighed once daily at the same hour as the birth. All of them were born at full term and were healthy, as were their mothers. He found that while the initial loss was sudden, the subsequent gain was much more gradual. Almost half the loss had been regained by the seventh day. The total average loss of the 73 children was 232.2 grams (8.19 ounces).

Most of the observations made by writers are to a degree misleading, in that the hours chosen for weighing bear a relation to the calendar day rather than to the hour of birth. Thus, for instance, an infant born at 11 P.M. has reached its second day of life after midnight. A weighing made of this infant at, say, 9 A.M., is that for the *second day*, whereas in the case of another infant but two hours younger, born at 1 A.M., the 9 A.M. weighing records that of the *first day* of life. The error which results necessarily occurs whenever a certain fixed hour of the day is chosen for the weighing of all infants, and although it is lessened by weighing twice a day, it is not entirely removed.

We have, therefore, followed in all of our cases the plan suggested by Kezmarsky. The infants were weighed immediately after birth, and again after they had been washed. They were then weighed every subsequent day at the same hour as that of birth. The results give the weights at ages which are *multiples of twenty-four hours*. The plan is manifestly much more accurate in its results. All reference in our own observations to "day" means the twenty-four hours of life irrespective of the calendar. Thus, "beginning of the third day" would denote always "beginning of the third twenty-four hours of life."

All of the children were nursed only at the breast of the mother, or, if the secretion was not promptly and well established, they were wet-nursed, but *not until the day upon which the maternal secretion should properly have been established*. The usual

normal physiological conditions were in this way not interfered with.

In all, 165 infants were studied. In order to exclude any possible sources of error these were grouped into two classes. In Class I. there was entire absence of any illness of mother or child. In Class II. some illness of mother or child occurred, but in no case was this of a serious or prolonged nature, and many of the infants showed as favorable conditions of growth as those in Class I. In fact, the separation of the infants into the two classes might have been omitted without grounds for unfavorable criticism.

The following table gives the results of our investigations:—

CLASS I. 95 CASES.

Mothers healthy, labor and puerperium normal. Babies full-term, breast-fed by their own mothers, healthy throughout.

Average weight at birth.....	7 lbs., 10.19 oz. (3,464.01 grams)
“ “ after the bath..	7 “ 9.5 “ (3,444.45 “)
“ loss during bath.....	0.693 “ (19.65 “)
“ lowest weight reached. 6 “	15.26 “ (3,154.15 “)
“ loss below birth weight	10.93 “ (309.87 “)

CLASS II. 70 CASES.

Mothers and babies healthy at latters' birth. Labor normal. Some slight temporary illness occurred in one or other, or both, during the first two weeks postpartum. All babies full-term and breast-fed by their own mothers only, except for short intervals after mother's lactation was established, when wet-nursing was temporarily employed, owing to illness of the mother.

Illness of Babies.—Fifty-one cases of enteric disorders, lasting in the great majority not over three days, and relieved by castor-oil and enteroclysis; 2 cases of mild sepsis with fever; 1 case of inspiration pneumonia lasting from second to fifth day without much apparent effect on growth, birth weight being regained on the sixteenth day.

Illness of Mothers.—Thirteen cases of “caked breast,” during the continuance of which babies were wet-nursed; 14 cases of mild sepsis not lasting over five days.

Average weight at birth.....	7 lbs., 11.32 oz. (3,496.05 grams)
“ “ after bath.....	7 “ 10.76 “ (3,480.17 “)
“ loss in bath.....	0.556 “ (15.76 “)
“ lowest weight reached. 7 “	0.26 “ (3,182.50 “)
“ loss below birth weight	11.06 “ (313.55 “)

Duration of Initial Loss, and Day of Final Regain of Weight.

A study of published statistics shows that in the majority of instances the initial loss continues for from two to four days. The time of regain of the birth weight is much more variable. In Schaeffer's 94 cases the initial weight was reached or exceeded by the seventh day in 14½ per cent., and between the seventh and fourteenth day in 41 per cent. The remaining 44½ per cent. were still under their initial weight by the fourteenth day. The lowest weight was usually reached on the third day.

Kezmarsky found that in 32 children of his first class, a gain in weight began on the first day in 6.25 per cent.; on the second day in 46.87 per cent.; on the third day in 25 per cent.; on the fourth day in 9.37 per cent.; after the fourth day in 12.51 per cent. In 41 children of the second class he found that gain began on the second day in 12.19 per cent.; on the third day in 36.58 per cent.; on the fourth day in 34.14 per cent.; after the fourth day in 17.09 per cent.

Gregory found that 88 per cent. of his 33 cases began to gain on the second or third day, in 12 per cent. after the third day.

In 20 per cent. of Haake's 100 cases gain began on the second day, in 58 per cent. on the third day, and in 22 per cent. on or after the fourth day. The majority reached their initial weight on the ninth day.

Of Winckel's 60 healthy infants, 36 had exceeded their birth weight by the tenth day.

Horn,⁶ in 146 cases, found that loss of weight continued through the second day in 19 cases; through the third in 51; the fourth in 38; the fifth in 24; the sixth in 6; the seventh in 3; the eighth in 3; the ninth in 1, and after the ninth day in 1 case. The initial weight was reached or exceeded two times on the third day; six times on the fourth; fourteen times on the fifth; eight times on the sixth; fourteen times on the seventh; sixteen times on the eighth; sixteen times on the ninth, and seventy times after the ninth day.

For purposes of comparison we may transpose Horn's figures into percentages as follows: Gain began on the third day in

13.03 per cent.; on the fourth day in 34.93 per cent.; on the fifth day in 26.03 per cent., and after the fifth day in 26.03 per cent.

In a careful examination of 600 children in the Griefswald Royal Lying-in Hospital, Schulz¹⁸ found that only 288 of these, or 48 per cent., had reached or passed their initial weight by the tenth day.

In our cases we found the following:—

CLASS I. 95 CASES.

Gain began on the 2d day in	1 case, or	1.05 per cent.		
“ “ “ “ 3d “ “	8 cases, “	8.36 “ “		
“ “ “ “ 4th “ “	35 “ “	36.90 “ “		
“ “ “ “ 5th “ “	33 “ “	34.74 “ “		
“ “ after “ 5th “ “	18 “ “	18.95 “ “		
Initial weight regained by the 7th day in	25 cases, or	26.32 per cent.		
“ “ “ “ “ 10th “ “	45 “ “	47.37 “ “		
“ “ “ “ “ 14th “ “	64 “ “	67.37 “ “		
“ “ “ after “ 14th “ “	31 “ “	32.63 “ “		

CLASS II. 70 CASES.

Gain began on the 2d day in	1 case, or	1.43 per cent.		
“ “ “ “ 3d “ “	4 cases, “	5.71 “ “		
“ “ “ “ 4th “ “	12 “ “	17.15 “ “		
“ “ “ “ 5th “ “	13 “ “	18.57 “ “		
“ “ “ “ 6th “ “	16 “ “	22.85 “ “		
“ “ “ “ 7th “ “	3 “ “	4.29 “ “		
“ “ after “ 5th “ “	40 “ “	57.14 “ “		
“ “ “ “ 7th “ “	21 “ “	30. “ “		
Initial weight regained by the 7th day in	5 cases, or	7.14 per cent.		
“ “ “ “ “ 10th “ “	18 “ “	25.71 “ “		
“ “ “ “ “ 14th “ “	31 “ “	44.29 “ “		
“ “ “ after “ 14th “ “	39 “ “	55.71 “ “		

From a study of this and our preceding table it is apparent that the infants whose mothers, or who themselves, were slightly ill (Class II.) suffered an initial loss only very slightly greater than the absolutely healthy cases (Class I.), but that the duration of the loss was prolonged and that the day of regain of the initial weight was deferred.

In general, we may conclude from our own observations and those of others, that in the majority of infants the minimum weight is reached by the third or fourth day; i.e., that gain in

weight begins by the fourth or fifth day, and that the initial weight is regained by the tenth to the fourteenth day.

The Total Average Initial Loss of Weight.

The total initial loss as determined by different observers can best be presented in tabular form:—

INVESTIGATOR.	CASES.	TOTAL LOSS.	
Bouchaud ¹⁹	54	100	grams (3.52 ounces)
Siebold ¹⁴		140-280	" (4.93-9.87 ")
Gregory ²	45	208	" (7.33 ")
Kezmarsky ³	32	220.8	" (7.79 ")
Ingerslev ²⁰	100	222.4	" (7.84 ")
Winckel ⁵	100	226	" (7.97 ")
Quetelet ²⁸	119	233	" (8.22 ")
Schaeffer ¹	94	337.6	" (10.60 ")
Griffith and Gittings,			
Class I.	95	309.87	" (10.93 ")
Class II.	70	313.55	" (11.06 ")
Townsend, ⁸ primiparæ ..	140	247	" (8.97 ")
" multiparæ ..	91	205.5	" (7.40 ")

From a comparison of all the statistics studied we may conclude that the average total loss varies from 3 to 12 ounces (85.05 to 340.20 grams), the majority placing it at from 7 to 8 ounces (198.45 to 226.80 grams), or from $\frac{1}{15}$ to $\frac{1}{17}$ of the body weight at birth.

Loss for Each Day.

The initial loss is divided unequally among the first few days—by far the greater part of it occurring in the first two days of life. In Kezmarsky's first class of 16 boys and 16 girls, the following loss and gain was observed:—

BOYS.		GIRLS.	
Day.	Percentage of loss or gain to birth weight.	Day.	Percentage of loss or gain to birth weight.
1	—3.52 per cent.	1	—4.10 per cent.
2	—2.30 " "	2	—2.50 " "
3	—0.31 " "	3	—0.12 " "
4	+0.95 " "	4	+0.85 " "
5	+0.60 " "	5	+1.08 " "
6	+1.22 " "	6	+0.48 " "
7	+0.67 " "	7	+0.85 " "

Although we have not made use of Gregory's statistics as to total loss or gain because of some slight illness occurring in the children of his series of 33, yet we may, for purposes of comparison, present his record of the first week. He found the following:—

Day.	Loss or gain in weight.	Percentage of loss or gain to birth weight.
1	—139 grams (4.90 ounces)	—4.17 per cent.
2	— 64 “ (2.26 “)	—1.91 “ “
3	+ 33 “ (1.16 “)	+ .99 “ “
4	+ 50 “ (1.76 “)	+1.50 “ “
5	+ 50 “ (1.76 “)	+1.50 “ “
6	+ 36 “ (1.27 “)	+1.08 “ “
7	+ 22 “ (.78 “)	+ .69 “ “

Our own observations were confined to the 95 cases of Class I., 44 boys and 51 girls.

BOYS.

Day.	Average loss or gain per day.	Percentage of loss or gain to birth weight.
1	—4.44 ounces (125.87 grams)	—3.52 per cent.
2	—2.53 “ (71.72 “)	—2.01 “ “
3	+0.40 “ (11.34 “)	+0.32 “ “
4	+1.55 “ (43.94 “)	+1.23 “ “
5	+1.09 “ (30.90 “)	+0.86 “ “
6	+1.06 “ (30.05 “)	+0.84 “ “
7	+0.19 “ (5.39 “)	+0.15 “ “

GIRLS.

Day.	Average loss or gain per day.	Percentage of loss or gain to birth weight.
1	—4.32 ounces (122.47 grams)	—3.64 per cent.
2	—2.05 “ (57.11 “)	—1.72 “ “
3	+0.35 “ (9.92 “)	+0.30 “ “
4	+1.52 “ (43.09 “)	+1.28 “ “
5	+1.42 “ (40.26 “)	+1.19 “ “
6	+0.94 “ (26.65 “)	+0.79 “ “
7	+1.26 “ (35.72 “)	+1.06 “ “

From a comparison of these tables it will be seen that the average percentage of loss during the first twenty-four hours equals about 4 ounces (113.40 grams), or from 3.5 to 4 per cent. of the birth weight; during the second twenty-four hours, about 2

ounces (56.70 grams), or from 2 to 2.5 per cent. of the birth weight. The percentage of gain above the lowest weight recorded by the end of the seventh day (168 hours) equals from 4 to 5 ounces (113.40 to 141.75 grams), or from 3.5 to 5.5 per cent. of the birth weight.

Influences Affecting the Loss and Gain in Weight.

I. SEX.

Haake found that newborn boys lost less weight than girls, and regained their original weight sooner. In a series of 100 cases the average total loss for 59 boys was 7.06 ounces (199.92 grams), or $\frac{1}{24}$ of the average birth weight, and for 41 girls 7.49 ounces (212.41 grams), or $\frac{1}{22}$ of their average birth weight; 66 per cent. of the boys, but only 46 per cent. of the girls had regained the birth weight by the ninth day.

In his series of 60 healthy cases Winckel found that the gain in 32 boys averaged 260.54 grams (9.19 ounces), and in 28 girls averaged 219.71 grams (7.75 ounces). Gregory's statistics indicate that male infants begin to gain sooner than females and regain their initial weight sooner. In his 33 cases, 12 boys and 21 girls, 11 of the boys, or 92 per cent., and 18 of the girls, or 86 per cent., began to gain on the second or third day; while 8 per cent. of the boys and 14 per cent. of the girls did not start to gain until the fourth or fifth day. On the day of discharge (the eighth) 5 of the boys, or 42 per cent., and 12 of the girls, or 57 per cent., had not reached their original weight; while 6 of the boys, or 50 per cent., and but 8 of the girls, or 38 per cent., had exceeded it. One boy and one girl had just reached their initial weight by the eighth day.

Kezmarsky's observations indicate, on the whole, that boys experience a smaller loss as well as a slightly earlier regain of the original weight. In his series of 32 infants, 16 boys and 16 girls, the loss for boys in the first three days was 6.13 per cent., or $\frac{1}{16}$ of the birth weight, and in girls was 6.72 per cent., or $\frac{1}{14}$ of the birth weight. Fourteen of the boys, or 87.4 per cent., and only 11 of the girls, or 68.7 per cent., showed a gain beginning in the first three days.

For purposes of comparison we have utilized the cases of our Classes I. and II., 165 in all, comprising 85 boys and 80 girls, the number being nearly equally divided between the sexes, and the initial loss being almost the same for Classes I. and II.

Forty-nine of the 85, or 57.65 per cent. of the males, and 58 of the 80, or 72.5 per cent. of the females, began to gain in weight on or before the fifth day, while 49, or 57.65 per cent. of the males, and 46, or 57.5 per cent. of the females, had regained their birth weight on or before the fourteenth day. The total average loss for males was 7.64 ounces (216.59 grams), and for females 14.52 ounces (411.64 grams). We may conclude that the total loss of weight in our cases was decidedly less in boys than in girls, and that the former regain their birth weight about the same time as girls, although girls appear to begin to gain earlier than boys.

The general conclusions to be drawn regarding the influence of sex, based upon the statistics given, are that boys lose less weight than girls and regain the original weight sooner. Our own figures, however, regarding the date of beginning gain are at variance with those of the authors quoted, since in our cases the girls commenced to gain sooner, or, in other words, the initial loss lasted a shorter time.

II. INITIAL BIRTH WEIGHT AND GENERAL ROBUSTNESS AND HEALTH OF THE INFANT.

Fleischmann states that the absolute loss of weight is greatest in the heaviest children, and Schaeffer also finds that babies with a birth weight considerably over the average exhibit a greater initial loss. Premature infants, however, show a far greater loss in weight than do those born at full term. Gregory states that the loss of weight in premature infants lasts two to three days longer than in full term children, and that the gain is slower and more variable, the eighth day of life showing only one-half of the initial loss regained.

Kezmarsky makes the following deductions from his cases:—

Total average loss in a child				
of light weight	235.49	grams	(8.31	ounces) 7.49%
Total average loss in a child				
of heavy weight	214.03	"	(7.55	") 6.24 "
Total average gain over initial				
weight in a child of light				
weight	117.27	"	(4.14	") 3.76 "
Total average gain over initial				
weight in a child of heavy				
weight	96.03	"	(3.39	") 3.19 "

He concludes that both the loss and gain in an infant of light weight are greater than in the heavier infants.

It will be seen that the views expressed are somewhat contradictory, some finding the loss greater and some less in the stronger and heavier children.

Our own observations, based upon the 95 cases of Class I., gave the following results:—

Birth Weight.	Number of Male Cases.	Loss of Weight.	Number of Female Cases.	Loss of Weight.
5-6 lbs. (2267.95-2721.54 gms.)			1	5.5 oz. (155.93 gms.)
6-7 " (2721.54-3175.13 ")	8	7.43 oz. (210.64 gms.)	16	6.48 " (183.71 ")
7-8 " (3175.13-3628.72 ")	19	8.90 " (252.32 ")	21	8.15 " (231.11 ")
8-9 " (3628.72-4082.31 ")	13	8.23 " (233.32 ")	11	11.43 " (324.04 ")
Over 9 " (4082.31 grams	4	10.90 " (309.02 ")	2	15. " (425.25 ")

There is an apparent discrepancy between the statement that heavier children lose more than light ones, when we consider that boys are heavier, yet lose less than girls. We therefore made separate observations on the sexes, and a study of the results confirms the belief that *the heavier the full term baby the greater will be the initial loss*, and maintains the accepted differences as to loss due to sex.

The presence of any illness, even though slight, may naturally be expected to interfere to a greater or less extent with the growth of the infant. Thus in the 70 cases of Class II. (p. 332), in which there was slight temporary disturbance of the infant's health, although the initial loss was practically the same as in the absolutely healthy infants, its duration was greater, and the date of final regain of the birth weight was postponed.

III. NUMBER OF PREGNANCIES.

Kezmarsky considers that the children of multiparæ commence to gain weight sooner and increase more rapidly than those of primiparæ, both because they suckle earlier and more vigorously, and because the supply of milk in multiparæ is established earlier and is more copious. In his studies upon 14 primiparæ and 18 multiparæ of his first class, he found that the gain in weight of the child began sometime during the first three days in 7, *i.e.*, 94.4 per cent. of the children of the latter and only in 8, *i.e.*, 57.1 per cent. in those of the former. In another series of 17 primiparæ and 24 multiparæ of his second class, 83.3 per cent. of the children of the latter gained within the first four days, but only 58.8 per cent. of those of the former.

Altherr¹⁰ found the loss of weight in children of multiparæ 6.5 per cent., and of primiparæ 7.2 per cent. of the initial weight.

Townsend⁸ published observations on a series of 231 breast-fed infants seen at the Boston Lying-in Hospital. One hundred and forty of these were the children of primiparæ, and 91 of multiparæ. They were all healthy, and were put to the mother's breast at from six to twelve hours after birth. His results are expressed in the following tabular statistics:—

	PRIMIPARÆ.	MULTIPARÆ.
Average loss	296 gms. (10.44 oz.)	253 gms. (8.92 oz.)
Day the weight was least	4th-5th day	4th day
Percentage which reached or surpassed weight on the 14th day	60 per cent.	63 per cent.
Average excess over birth weight on the 14th day	minus 1.70 gms. (0.06 oz.)	plus 5.67 gms. (0.20 oz.)
Average excess in those who surpassed birth weight on the 14th day	163 gms. (5.75 oz.)	172 gms. (6.07 oz.)
Average deficiency in those who failed to reach birth weight on the 14th day	218 gms. (7.69 oz.)	202 gms. (7.13 oz.)

In our 95 cases of Class I., we found the following:—

	23 PRIMIPARÆ.	72 MULTIPARÆ.
Average loss	9.54 oz. (270.46 gms.)	9.40 oz. (266.49 gms.)
Percentage beginning to gain on or before 5th day	78.26 per cent.	79.17 per cent.
Percentage beginning to gain after 5th day	21.74 per cent.	20.83 per cent.
Percentage which reached or sur- passed birth weight by 14th day	59 per cent.	70.83 per cent.
Average excess over birth weight by		

14th day	+1.41 oz. (39.97 gms.)	+2.24 oz. (63.50 gms.)
Average excess in those who surpassed birth weight by 14th day	7.2 oz. (204.2 gms.)	5.65 oz. (160.18 gms.)
Average deficiency in those who failed to reach birth weight by 14th day	6.16 oz. (174.64 gms.)	6.82 oz. (193.35 gms.)

Our figures practically confirm those of Townsend. *In general it can be said that in children of primiparæ the average loss is greater, the duration of loss is longer and day of regain of birth weight is later than in those of multiparæ. The total gain during the first fourteen days of life is greater in the children of multiparæ.*

IV. AGE, WEIGHT AND GENERAL CONDITION OF HEALTH OF THE MOTHER.

Schaeffer's investigations showed that the infants of young mothers weighing under 55 kilograms (121¼ pounds) exhibited a loss up to the seventh day, and usually up to the fourteenth day. Where the mothers weighed over 55 kilograms there was a gain at both dates. The younger and lighter the mother, especially in the case of primiparæ, the longer the period until the infant regained its birth weight. The amount of weight lost by the mother during the lying-in period also exerted an influence upon the weight of the infant. Where the maternal loss exceeded 2½ kilograms (5½ pounds) and lasted longer than six to eight days, unfavorable growth was observed in the infants in 25 cases; where the loss was less than 2 kilograms (4½ pounds) and did not continue over two or three days the growth of the infants was unusually satisfactory in 23 cases. Average cases between these extremes, with resulting average growth of the infants, numbered 46.

In analyzing the maternal influences affecting the infants' alteration in weight in 600 cases, Shultz found that in the 312 cases which failed to regain their original weight by the tenth day of life there were 39 of the mothers who showed disturbances of temperature, probably septic; 22 had mastitis, fissured nipples, or some other local cause preventing proper suckling; 20 were of so-called "delicate build," presumably tuberculous, and 16

showed under-development of the breasts with poor nutrition of the body.

In a comparison of results in Classes I. and II.—in I. where both mothers and infants were healthy, and in II. where slight illness was present in one or both—we found as stated (p. 15a or p. 17) that the total loss of weight in the cases of Class II. was only slightly greater than in those of Class I., but that the duration of the initial loss was greater and that the day of regain of the birth weight was later. In analyzing the causes for this we find that of the 70 cases of Class II., 13 of the mothers suffered from “caked breast,” and 14 showed symptoms of mild sepsis.

V. EARLY LIGATION OF THE CORD.

Zweifel⁹ claimed that delay in the ligation of the umbilical cord allows more blood to enter the circulation of the infant, thereby rendering the child more vigorous and diminishing the physiological loss. By weighing the blood in the placenta he estimated that the child's body receives 100 grams (3.53 ounces) more blood if the cord is not cut until the placenta has been expelled. In eleven infants treated in this manner the physiological loss averaged 156.7 grams (5.5 ounces), while in 25 cases of early ligation it averaged 211 grams (7.44 ounces).

Townsend, however, found that the time of ligation of the cord in healthy infants had little or no effect on the initial loss of weight except in cases of asphyxia.

C. Is the Initial Loss of Weight Physiological?

As has been said, Haake believed that the initial loss of weight is not to be considered as pathological, but as one of the links in the chain of physiological changes in the newborn. He therefore questioned the advisability of attempting to prevent it, even were it possible.

Kehrer,¹⁰ however, takes a different view. He claims that no initial loss of weight occurs in the newborn of other mammals than man, and he believes this is partly due to the abundant nourishment taken by the mother both before and after parturition, partly to the earlier establishment of the secretion of milk, and partly to the greater general strength and power of sucking possessed by the young of other mammals. Whether we are to accept the older opinion of Haake, that the initial loss is a necessary and physiological one which need not be combatted, or whether

we should attempt to prevent it, was one of the principal objects of our investigations.

Ingerslev was one of the earliest pediatricists to attempt to avoid the initial loss. He found that in sixteen babies nursed directly after birth by women who were four or five days postpartum, the loss of weight was greater than in sixteen babies suckled only by their mothers, and furthermore, that the former started to gain later than the latter.

Cramer,¹¹ on the other hand, has repeatedly seen instances where, if the antepartum discharge of meconium and urine were free, the newborn at once showed a gain in weight, provided that a very abundant and early supply of nourishment was given. He refers to Ritter of Rittersheim, who prevented the initial loss entirely in 28 out of 100 cases. Cramer believes, however, that the early nourishment of infants entails so often the use of artificial mixtures that it is of questionable utility; and, further, that the loss during the first two or three days does no harm. He cites 5 cases of infants, 3 of whom were fed with large amounts of nourishment soon after birth, and 2 with minimal amounts, all of whom developed normally and on the tenth day had exceeded their initial weight. He advocates strongly, however, abundant nourishment for the parturient women.

Kezmarsky observed that by abundant nourishment of the pregnant and parturient woman the loss in the first few hours of the infant's life, before the discharge from the bladder and bowels has occurred, can not infrequently be avoided, and even occasionally be changed into a small but transitory gain.

With regard to the rôle played by the normal excretions in the initial loss of weight, Townsend calculates that the loss from meconium, urine, etc., varies from 90 to 150 grams (3.18-5.29 ounces), while the loss by the removal of the vernix caseosa, blood, etc., through the bathing of the child averages 45 grams (1.59 ounces). According to Bouchaud,¹⁰ the loss by urine amounts to from 10 to 15 grams (.35-.53 ounces); exhalation from lungs and skin 50 to 60 grams (1.76-2.12 ounces); meconium 60 to 90 grams (2.12-3.18 ounces); through loss by drying of hair and nails 5 grams (.18 ounces).

Kehrer finds that when the initial loss is not apparent within the first hours postpartum, it is usually due to the failure of meconium and urine to be excreted.

Gregory is inclined to believe that the initial loss may be cut short by wet-nursing from birth. He urges, too, to accomplish

the same result, the early supplying of parturient women with more nourishing food than is commonly advised.

It would appear, then, to be generally admitted that some degree of initial loss through the discharge of urine and meconium and through bathing is unavoidable. Whether further loss is preventable by early feeding is disputed. Kezmarsky, Ingerslev and Haake maintain that it is not; Cramer believes that it can be prevented, but doubts whether it is advisable to make the attempt.

The question of the physiological nature of the initial loss has been one of special interest us. To determine this, we had all infants weighed just before, and again just after the initial bath. The results showed a loss varying from 0.5 ounces (14.18 grams) to 6 ounces (170.10 grams) and averaging about 0.788 ounces (22.34 grams). This loss is to be attributed to the excretion of urine, and to the discharge in some cases of meconium, as well as to the removal of the vernix, blood, etc., through washing. These figures are smaller than those obtained by Townsend. Further loss is to a certain extent physiological, through the continued excretion from the bowels, bladder, lungs and skin; and it only remains to discover whether this can be made up by early and abundant feeding. To determine this we had sixty-one infants wet-nursed regularly from birth by women in the Retreat who had recently given birth to children. The nursings were given every four hours until the maternal milk was secreted, after which wet-nursing ceased. Weighings were made daily during the first two weeks of life, in the manner already described. The results can best be shown in the following tables:—

The cases were divided, as with the infants previously considered, into those who were absolutely healthy, as were their mothers (Class A) and those who themselves, or their mothers, had suffered from slight indisposition (Class B). All cases were excluded in which either the mothers or the infants had been distinctly ill.

CLASS A.—40 CASES.

Mothers healthy, labor and puerperium normal. Babies full-term, healthy throughout:—

Average weight at birth.	7 lbs.,	2.24 oz.	(3,238.63 grams)
“ “ after bath.	7 “	1.09 “	(3,206.03 “)
“ loss during bath.		1.15 “	(32.60 “)
“ lowest weight reached. 6 “	12.85 “		(3,085.83 “)
“ loss below birth weight	5.39 “		(152.81 “)

Gain began on the 2d day in 4 cases, or 10 per cent.

"	"	"	"	3d	"	"	2	"	"	5	"	"
"	"	"	"	4th	"	"	10	"	"	25	"	"
"	"	"	"	5th	"	"	11	"	"	27.5	"	"
"	"	"	"	after	"	"	13	"	"	32.5	"	"

Initial weight regained by 7th day in 14 cases, or 35 per cent.

"	"	"	"	10th	"	"	21	"	"	52.5	"	"
"	"	"	"	14th	"	"	31	"	"	77.5	"	"

Initial weight not regained

until after	14th	"	"	9	"	"	22.5	"	"
-------------	------	---	---	---	---	---	------	---	---

CLASS B.—21 CASES.

Mothers and babies healthy at latter's birth. Labor normal, infants full-term. Slight illness present in mother or baby during first two weeks postpartum. Four cases of "caked breast" and 2 cases of slight septic infection in the mothers. Seventeen cases of mild enteric disturbance in the infants:—

Average weight at birth. 7 lbs., 11.18 oz. (3,492.08 grams)

" " after bath. 7 " 9.93 " (3,456.64 ")

" loss during bath. 1.25 " (35.44 ")

" lowest weight reached. 6 " 15.41 " (3,158.41 ")

" loss below birth weight 11.78 " (333.96 ")

Gain began on the 3d day in 1 case, or 4.76 per cent.

"	"	"	"	4th	"	"	5 cases,	"	23.81	"	"
"	"	"	"	5th	"	"	8	"	38.08	"	"
"	"	"	"	6th	"	"	4	"	19.05	"	"
"	"	"	"	after	"	"	7	"	33.34	"	"
"	"	"	"	6th	"	"	3	"	14.29	"	"

Initial weight regained by 7th day in 4 cases, or 19.05 per cent.

"	"	"	"	10th	"	"	12	"	"	57.14	"	"
"	"	"	"	14th	"	"	15	"	"	71.43	"	"
"	"	"	"	after	14th	"	6	"	"	28.57	"	"

Comparing the absolutely healthy cases nursed only by their mothers (Class I.) with the absolutely healthy cases which were wet-nursed during the first few days (Class A), we find the following:—

	CLASS I. 95 cases.	CLASS A. 40 cases.
Gain began by the 2d day.....	1.05 per cent.	10. per cent.
“ “ “ “ 3d “	9.47 “ “	15 “ “
“ “ “ “ 4th “	46.32 “ “	40 “ “
“ “ “ “ 5th “	81.05 “ “	67.5 “ “
“ “ after “ 5th “	18.95 “ “	32.5 “ “
Birth weight regained by 7th day..	26.32 “ “	35 “ “
“ “ “ “ 10th “ ..	47.37 “ “	52.5 “ “
“ “ “ “ 14th “ ..	67.37 “ “	77.5 “ “
“ “ “ after 14th “ ..	32.63 “ “	22.5 “ “

Average initial loss

of weight 10.93 oz. (309.87 gms.) 5.39 oz. (152.81 gms.)

In a series of 61 cases the day the milk appeared in the mother's breast was noted. Secretion was established on the first day postpartum in 1 case, or 1.64 per cent.; on the second day in 7 cases, or 11.48 per cent.; on the third day in 38 cases, or 62.30 per cent.; on the fourth day in 14 cases, or 22.95 per cent., and on the fifth day in 1 case, or 1.64 per cent.—or, in other words, the mothers were able to nurse their infants by the second day in 13.12 per cent. of the cases, by the third day in 75.42 per cent. and by the fourth day in 98.36 per cent.

Our observations would lead us to conclude, therefore, *that, while the initial loss of weight in a newborn infant cannot be entirely prevented, it can be materially lessened by the exhibition of the milk of another nursing woman until the mother's secretion has been established, yet that this offers no very great advantage, and certainly the difference in the rates of gain does not justify the administration of any artificial food during the first days of life.*

BIBLIOGRAPHY.

1. Schäffer. *Archiv. f. Gyn.*, 1896, p. 2,282.
2. Gregory. *Ibid.*, 1871, Vol. II., p. 48.
3. Kezmarsky. *Ibid.*, 1873, Vol. V., p. 547.
4. Haake. *Monatsch. f. Geburtshund.*, Vol. XIX., p. 339.
5. Winckel. *Ibid.*, Vol. XIX., p. 416.
6. Horn. *Münch. Med. Woch.*, March 21, 1899, p. 377.
7. Fourmann. *Bonn Thesis*, 1901.
8. Townsend. *Boston Medical and Surgical Journal*, February 17, 1887, p. 157.

9. Zweifel. *Centralbl. f. Gyn.*, No. I., 1898.
10. Fleischmann. *Über Ernährung u. Körperwägung. der Neugeborenen u. Säuglinge.*
11. Cramer. *Münch. Med. Woch.*, 1900, p. 1,585.
12. Camerer. *Jahrb. f. Kinderheilk.*, Vol. XXXVI., H. III., p. 249.
13. Schulz. *Greifswald Thesis*, 1903.
14. E. Siebold. *Monatsch. f. Geburtskund.*, Bd. 15, Hft. V.
15. Frankenhäuser. *Ibid.*, Bd. XIII., p. 171.
16. Gassner. *Ibid.*, Bd. XIX., p. 21.
17. Hecker. *Ibid.*, Bd. XIX.
18. Longridge. *Brit. Jour. Child. Dis.*, September, 1905.
19. Bouchaud. *De la Mortè par Inanition, etc.*, 1864.
20. Ingerslev. *Nord. Med. Ark.*, 1875, Vol. VII., Nos. 7 and 11.
21. Kleinwachter. *Zeitsch. f. Geb. u. Gyn.*, Vol. X., p. 55.
22. Holt. *Diseases of Children.*
23. Duncan. *Edinburgh Medical Journal*, December, 1864, No. 115.
24. Wiedenmüller. *Zür Statistik des engen Beckens. In. Diss. Marburg*, 1895.
25. d'Outrepont. *Monatsch. f. Geburtskund.*, Vol. XIII., p. 171.
26. Ahlfeld. *Berichte u. Arbeiten*, Bd. III., p. 100.
27. Kleinwächter. *Zeit. f. Geburtshulf. u. Gyn.*, Vol. XI., p. 222.
28. Quetelet. *Anthropometria*, 1870, p. 177.
29. Peterson. *Upsala läkeref förhandl.*, 1882, Vol. XVIII., p. 15.

DISCUSSION.

DR. CHURCHILL.—At the beginning of the six months there appears to be a falling off in the rate of gain; was there any special reason for that?

DR. HOLT.—I was interested in the point that Dr. Churchill just made, viz., the slow rate of gain during the third quarter as compared with the first, second and fourth quarters. I have come to the conclusion that dentition may possibly have some influence in the matter. It has seemed to me also that this is about the time when maternal nursing often fails. From the ninth to the twelfth month is often the time after which the child has become well started in artificial feeding.

The curve which Dr. Freeman has given very closely resembles the one I obtained. The relation of the weight to the other measurements is rather interesting and corresponds, I think, to what we have learned in practice, that children who do not gain in weight do not grow very much.

DR. KOPLIK.—I think this is the most important contribution we have had in late years to the subject of increase of weight in the newborn baby. There is a tendency among general practitioners to force feeding during the first twenty-four hours. Often the mother is actually inconvenienced and not only is she disturbed, but a great deal of harm in the way of eroded nipples is

done by attempts to put the baby at the breast every two hours in the first twenty-four hours after birth. I have always thought, as Dr. Griffith has no doubt concluded, that there is not much to be gained in feeding the baby during the first twenty-four hours. I had occasion lately to place a newborn baby from within six hours after birth until the eighth day on the breast of a wet nurse, whose baby was perfect, two months old, and she a fine specimen of womanhood. The baby didn't lose and did not gain one ounce, so that really there was little advantage in being so hasty to put the baby immediately at the wet nurse's breast. We can very well afford to wait from twenty-four to forty-eight hours. I think this paper will have a good effect in teaching the general practitioner that he need not put the newborn infant immediately at the breast and force it to feed and so disturb and inconvenience the mother.

DR. CHURCHILL.—With regard to the falling off in weight, I have noticed that breast-fed babies are very apt to fall off in their rate of gain at about the sixth or seventh month, the time at which many of them are adapting themselves to new conditions of feeding. For few American mothers nurse their babies beyond this time.

DR. ROTCH.—In regard to the significance of the growth of the stomach, it is in the third quarter that the growth of the stomach is not so great as in the first and second. A great number of measurements have shown that to be true.

DR. WINTERS.—Is it the sense of this Society that it is immaterial whether a child is fed during the first twenty-four hours? Some years ago I did some obstetrical work and it was my experience that a mother who nursed her child at once had healthy children. I recall one woman who has had twelve children and has never lost one, the oldest now twelve years of age, every one of whose children were placed at the breast immediately. I think the child should be put at the breast as soon after birth as practicable.

DR. JACOBH.—The increase of weight in the newborn is normally a steady one up to six months. At that time the baby weighs just twice as much as it weighed at birth; that is the rule. Now in regard to the feeding of the baby, in my younger years I had a good many opportunities of seeing the weighing of babies. Between 1854 and 1870 I did a great deal of obstetrical work and saw a great many babies weighed, and either starved or nursed. I remember in 1869 having a conversation on this subject with Ritter von Rittersheim. Before and since that time I have always fed the babies from the beginning, but tried not to feed them on what is called their natural food. Their natural food is a very unnatural food. Nature does not always do what is proper. It will probably take us ten thousand more years to adapt ourselves

and maternal breasts and our babies to one another. Colostrum contains four times as much proteids as milk. It is human proteids, but still proteids. If they were spared the difficulty of digesting the colostrum it would be a good thing. They lose immediately through different channels, first by urinating. Besides, the lungs become active, so does the skin, and they lose in this way. It is mostly water they lose with salts, and that is a very serious matter, for the tissues dry up and they lose weight. That is why water should be supplied them, and there are other reasons why they should have plenty of water. I have spoken on different occasions of the necessity of washing out their kidneys to clear out the uric acid infarctions, etc., but the principal reason is that they constantly lose water and salts and their tissues dry up; if you give them water they will not lose in the same proportion. They lose 9, 10 and 12 per cent. of the original weight, which should be considered unnatural. The proper thing to do is to give them plenty of water. Whether you want to add 10 or 12 per cent. of properly prepared cow's milk to it—I say properly prepared—is for each one to decide; I think it is a good thing. If you do this, the babies will not lose more than a few ounces in the first week, if at all.

DR. CHAPIN.—While the colostrum contains much more proteid than the milk, it is in soluble form, so that it would hardly seem a fair analogy to compare that with the proteid later on. It has a very large amount of soluble proteid which may be utilized in this way to prevent loss of weight.

DR. FREEMAN.—While the well nourished children showed the least gain during the third quarter, they represented but 25 per cent. of the cases. The fairly and poorly nourished children, representing 75 per cent. of the cases, showed the least gain in the fourth quarter. No statistics about dentition were made. There is not, in my experience, that falling off in gain in the third quarter represented by most of the charts.

DR. GRIFFITH.—No one, I think, so far I know, has made as extensive investigations into the subject of weight during the first year of life as has Camerer. You will recall that he also found that in a large number of cases there is a physiological falling off in weight about the eighth or ninth month, and he attributes this to dentition. I have always, however, been skeptical about the influence of dentition in the matter.

Regarding our own observations, we were very much impressed, indeed, by the very meagre details in medical literature bearing upon the question as to the physiological nature of this loss of weight in the first days of life. There were a good many opinions given, but few systematic studies. Our studies go to show that the loss is to some extent a physiological one and that it is certainly not worth while to do anything to prevent it.

HYDRENCEPHALOCLE AND SPINA-BIFIDA.*

BY B. K. RACHFORD, M.D.,
Cincinnati, Ohio.

January 14, 1906.—Male child, nine hours old, weight seven pounds and ten ounces, was admitted to the Cincinnati Hospital.

The family history was good, except that one aunt had Pott's Disease. There was no family history of venereal disease, or of congenital malformations.

The infant was delivered at full term without forceps, and was well developed and well nourished, except for the congenital malformations here described.

A large hydrencephalocle, forming a tumor about the size of the child's head, protruded from the occipital region. It was covered with skin over about half its surface, the other portion being covered with meninges. It did not fluctuate and was not translucent. This tumor mass was somewhat pedunculated, measuring at its attachment 4 cm. in its verticle diameter, and 4½ cm. in its horizontal diameter.

The spinous processes were separated from about the sixth dorsal vertebra to the sacrum, and through this opening the spinal cord was exposed.

At the time of admission the reflexes were well marked in both the upper and lower extremities, and the lower extremities appeared to be partially paralyzed.

January 23d.—The child's weight at this date was six pounds and six ounces, a loss of one pound and four ounces in nine days. During this time the child has gradually lost in strength, and is now very feeble. It has taken very little food, and its temperature has been for the most part subnormal, except when artificial heat was applied. The paralysis of the lower extremities is now complete. Reflex movements, however, may still be elicited.

The spinal cord is now covered by an inflammatory exudate. Two symmetrical patches of superficial gangrene about the size of a quarter have appeared on the buttocks.

February 8th.—Child died to-day, following slight convulsive seizures of the head and other extremities.

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 31, 1906.

Necropsy showed hydrencephalocoele and spina-bifida.

White male infant, postmortem staining and rigidity present, weight five and a half pounds.

External examination showed a large mass about the size of the infant's head protruding from the occipital region; two large sores on the buttocks; separation of the spinous processes extend-



ing from about the sixth dorsal vertebra to the sacrum, and between these spinous processes a soft degenerated mass holding the remains of the spinal cord of this region.

On opening the protruding tumor of the occipital region it was found to contain about two and a half ounces of blood-stained fluid and an old organized blood clot about the size of a walnut. The tumor itself was composed of the elongated occipital lobes of the cerebrum and a small cerebellum.

The cerebral mass was found to be degenerated, soft, easily broken down, and contained open spaces communicating with the lateral ventricles of that portion of the brain which was contained within the cavity of the skull.

The exposed cord was degenerated and easily broken down and partially lost in the plastic exudate which had been thrown around it.

The other organs were normal, with the exception that four or five supernumerary spleens were found.

The remarkable temperature record which this patient presented is here appended. During the three or four days preceding the death of the child the influence of artificial heat upon the body temperature is graphically portrayed. The temperature rising in the course of a few hours to 107° or 108° F., under the influence of hot water bottles and other external heat, and then again as rapidly falling to 92° F. when the external heat was removed.

The explanation of these remarkable excursions in temperature under the influence of artificial heat may possibly be found in the fact that the feeble inhibitory centres of the immature and malnourished infant is the first portion of the heat regulating mechanism to give way under adverse conditions.

It will be noted in this case that as the child grew feebler, and as its vital forces ebbed, the body temperature was more and more influenced by the application of external heat. As the malnutrition of the nervous centres became more and more extreme, the inhibitory centres failed more and more to exercise a restraining influence over the thermogenic centres, and as a result of this maladjustment of the heat regulating apparatus the body temperature of this child responded in a remarkable manner to varying degrees of external heat.

Holt has called attention to "some very puzzling and alarming temperatures seen in young infants as the result of application of artificial heat," and he observes "that the younger and feebler the child the more readily are such temperatures produced." I have elsewhere* dwelt at length upon this instability of the heat-regulating mechanism in premature infants, as well as in full term infants suffering from extreme malnutrition.

* *Neurotic Disorders of Childhood*, 1905.

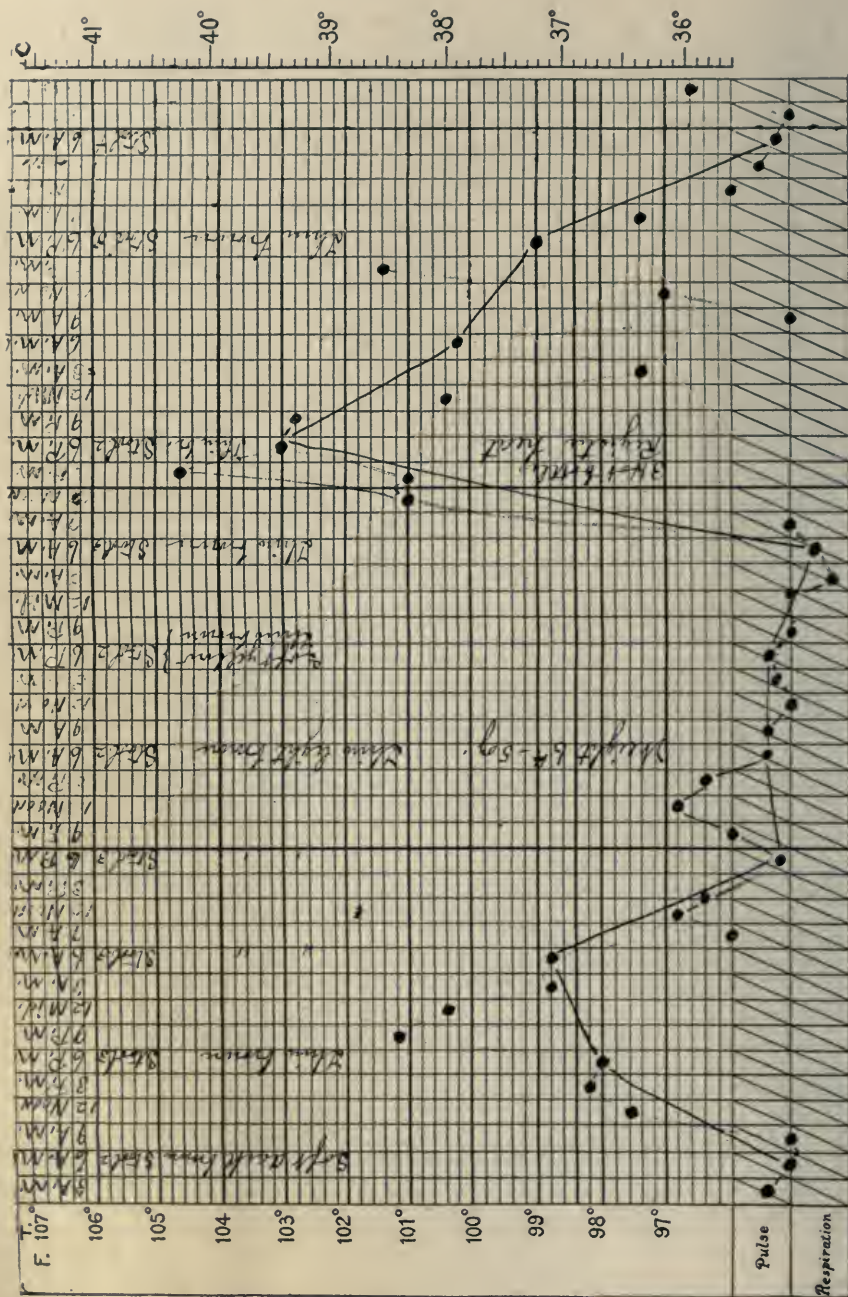


CHART II.

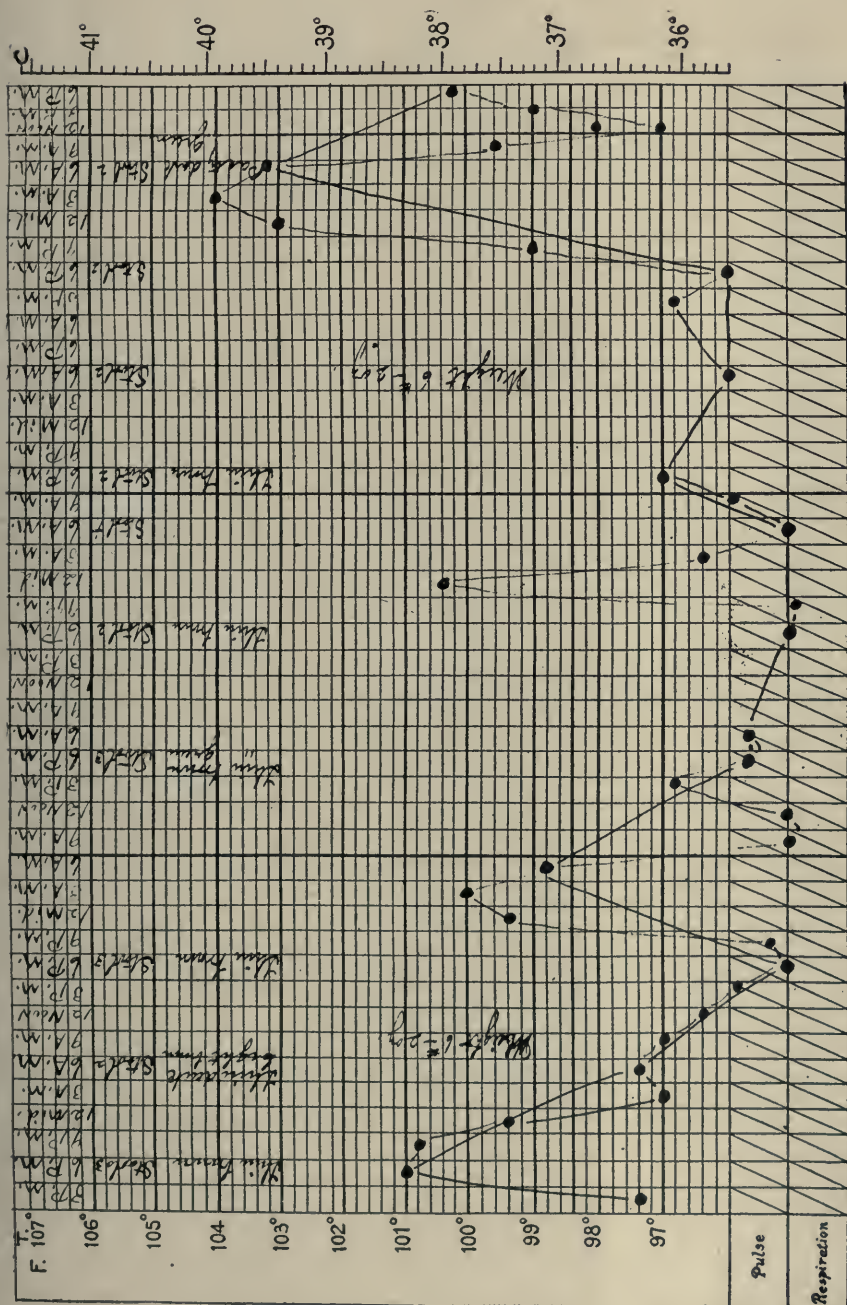


CHART III

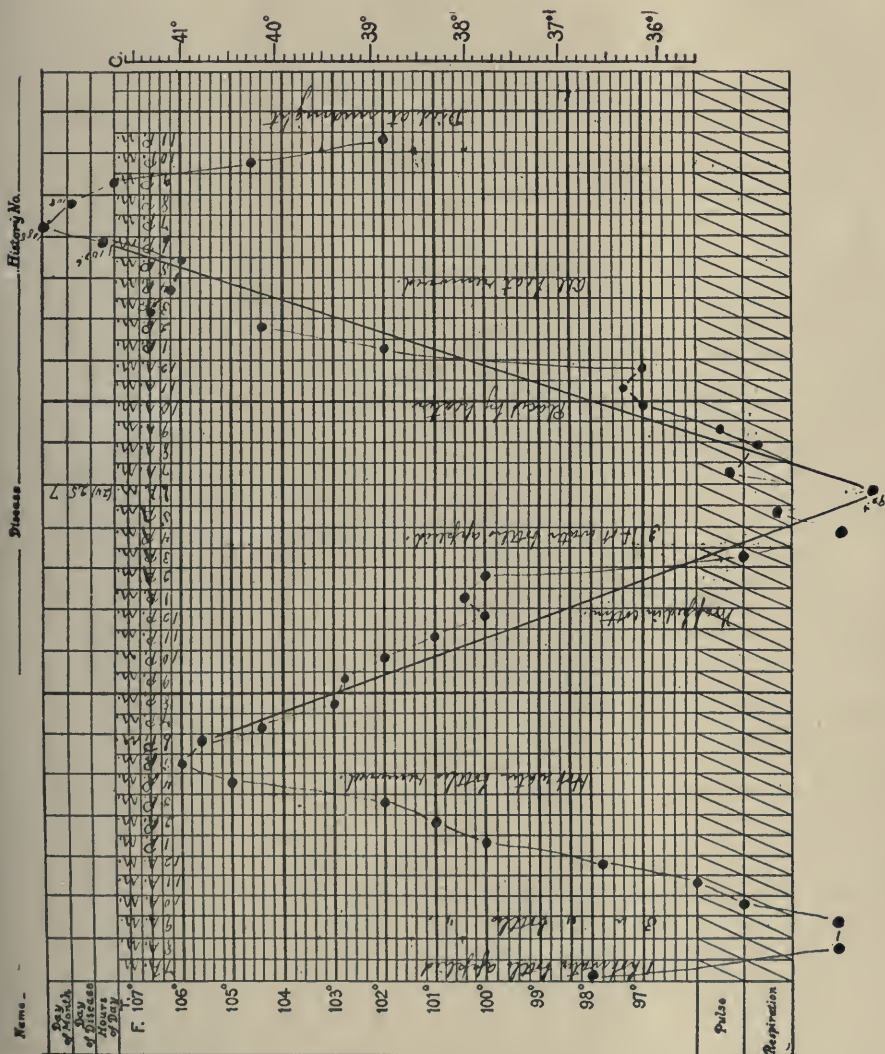


CHART V.

CARBOLIC ACID POISONING BY RECTAL INJECTION.*

BY GEORGE N. ACKER, M.D.,
Washington, D. C.

The cases that I report illustrate the danger of the use of carbolic acid in the treatment of diseases of children. There have been cases reported where even a small quantity of this medicine externally applied has produced severe symptoms.

CASE I.—May 6, 1906, Mr. R., who lives some distance in the country, telephoned to me that his son, aged six years, was in a comatose state from the effects of a rectal injection of carbolic acid. As I could not leave the city at that time, I gave him directions in regard to treatment. When I saw the child he was in a good condition. From the mother I obtained the following statement of the case:

“DEAR DOCTOR:—In regard to King’s carbolic acid poisoning, I put a teaspoonful of the acid in a pint of warm water, not stirring it up, and poured it in a rubber bag. I gave him the enema, using half the water, and in a few minutes the remainder. Almost immediately I noticed his eyes closing as though he were falling asleep. He stood up for me to fasten his clothes, his eyes still being closed, was unsteady, and would not answer, although he stood some little time. I then laid him on the couch, removing his shoes and collar, and his eyes rolled considerably. We then carried him to another room and placed him in bed, and his eyes rolled still more. When he was first taken, after being placed on the couch, he suddenly jumped up, walked a few steps and fell flat. He did not know then what he was doing. When we undressed him his limbs and head hung limp. He lay in this state, apparently knowing nothing, from 6 to 8 P.M. He would occasionally groan or whimper, and was finally aroused. He afterwards complained of soreness in the abdomen and some pain

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, June 1, 1906.

in the private parts. The next day the urine was very dark; in fact, almost black, and the odor was that of carbolic acid only. His pulse during the unconsciousness was very rapid and very irregular."

The injection was given for seat worms, the father having read in a family medical work that an injection of a mild solution of carbolic acid was good in this disease.

CASE II.—Several years ago I saw, in consultation with Drs. W. S. Bowen and S. S. Adams, D. M., male, three years old, who had diarrhea, and the family physician ordered bowel irrigations with a teaspoonful of boric acid to a quart of warm water. The mother by mistake used carbolic acid, and proceeded to wash out the child's bowels. After she had injected about three ounces of the fluid the child became suddenly unconscious and remained in that condition with feeble pulse and respirations for eight hours, the skin being very much congested. It was only by active stimulation and use of salt solution under the skin and by bowel that the child was kept alive. After eight hours he gradually regained consciousness and made a complete recovery, though weak for several days, during which time the urine had a dark color.

In both these cases there can be no doubt that the acid was not mixed with the water before being put in the bag, and settled to the bottom, the children receiving the poison with first ounce or two injected. It will be noted how quickly the drug was absorbed and toxic effects produced.

DISCUSSION.

DR. ADAMS.—I would record a case in which carbolic acid was given by the mother for tape-worm. She had noticed the presence of something which looked like tape-worm, and which subsequently proved to be a tape-worm, and had gone to her physician's office. The physician being out, she communicated her mission to the doctor's wife, who told her she knew what the doctor would order, and told her to go home and give the child an injection of carbolic acid. An injection was given of a solution containing a teaspoonful of carbolic acid to the quart, and when it had been given the child began to show evidence of nervous excitement, and then went into a state of coma. I reached the house about twelve o'clock at night, which was about four hours after the injection had been given. At that time the

child had recovered somewhat so that she could speak and answer questions, but there was decided evidence of carbolic acid poisoning such as I had seen follow applications to the skin and scalp and inhalations of cresolene vapor. There was marked pulmonary edema. The child was somewhat hysterical, as was the mother. I pronounced the case one of carbolic acid poisoning, and the examination of the urine the next day showed the presence of carbolic acid. The injection did not bring away the tape-worm. Some of the small sections were passed, and subsequently I went fishing for the worm and got it, head and all.

I induced Dr. Acker to report these cases because of the tendency of parents to give carbolic acid injections in this indefinite way for worms. It is probable that more of these cases of poisoning occur than we have any idea of, and we should give parents a note of warning in regard to the danger. I have seen in surgical cases, when I first began to practice, and when carbolic acid was used so much as a spray, the room filled with the spray until everyone was saturated, cases of poisoning occurred and the surgeons wondered what was the matter with the patients. Subsequently we found out!

Early Sign of Measles. — An editorial note (*Semaine Médicale*, Vol. XXVI, No. 47) states that Flesch and Schosberger found on examining the blood of 26 normal individuals that the mononucleated neutrophils with the nuclei more or less deeply indented averaged 36, while those with two lobes averaged 45, with three lobes 15, with four lobes 3 and with five lobes 1. The younger the cell the more even its outline. They also found that in 5 cases of measles the leukocytes with simply indented nuclei were abnormally numerous, amounting to 63, or 71 per cent., and increasing to 80 and 85 per cent. the day before the eruption appeared. In 2 other cases the proportion was 81 and 85 per cent. two days before Koplik's sign was evident. In another case in which Koplik's sign never appeared, the proportion was 60 per cent. four days before the exanthem. Simple examination of the dried blood with the Jenner or tri-acid stain reveals this hematologic sign of measles several days before any other sign. It was first discovered in examining the blood of two children convalescing from scarlet fever, and was a puzzling finding until explained by the development of measles a few days later.—*Journal of the American Medical Association.*

A CASE OF MEASLES SUPERIMPOSED ON SCARLATINA.*

BY P. J. EATON, M.D.,
Pittsburg, Penn.

Betty S. was five years old in January, 1906. Family history good. Previous history not essential, except in one particular. In June, 1905, had had adenoids removed, and at the same time hypertrophic tonsils properly reduced by the cold snare. This was followed by an improvement in the matter of the frequency of occurrence of attacks of laryngitis, to which she had been more than ordinarily susceptible. Her throat and nose then were in first-class condition. On February 16th of this year I was called to see her, and was told that she had had some fever the previous day; had vomited several times, and that her bowels had been quite sluggish for a day or two. I examined her thoroughly, believing that she had been exposed to measles at school. There were absolutely no signs in her throat, and no rash on her skin. I gave her some calomel and soda in divided doses, and ordered a high enema. Her temperature was then, at 10 A.M., 101.8° F. On the morning of the 17th she was completely covered with scarlatina exanthem. The throat was remarkable only in a negative way. There existed slight redness on the tonsils, but no exudate. Nothing abnormal could be seen on the soft palate or buccal mucous membrane. She was at once isolated, and a competent nurse installed. The temperature ran from 102° to 104° F., and the child was quite comfortable. On the 20th the scarlatinal rash seemed less intense in color, yet the temperature ranged between 103° and 104° F., and a rather harsh cough was beginning, but there was no especial coryza. There was no enanthem, yet I felt convinced that measles would soon show. The cough was very characteristic. The urine had been examined several times, and except for a very slight trace of albumin was not remarkable. By evening of the 20th the measles rash was very pronounced all over body, and in the throat could be seen a diffused redness, which also came up on roof of mouth. On the 23d the rash of the scarlatina was much faded and the measles exanthem was more evident by contrast. On the 24th the latter

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 31, 1906.

rash was fading and the temperature was declining. Until the 1st of March the temperature varied from 99° F. in the morning to 102° or 103° F. at night. From that date convalescence was uninterrupted. A curious double desquamation occurred March 1st or 2d, that of the measles beginning about the time of first normal temperature, while the characteristic peeling of scarlatina occurred from March 5th to 25th. The urine was normal at this latter date, and there had occurred none of the possible complications. The cough disappeared with the fall of temperature to normal; the appetite, which had been very poor during the whole active period of the disease, improved rapidly, and a normal recovery took place. The child has been in very good health ever since.

I much regret that I cannot show the very careful temperature and pulse chart kept by the nurse, but, unfortunately, it was burned when the disinfection of the house was accomplished.

The points to be noted are, I think, the absence of preliminary enanthema; the appearance of the rash of measles upon the scarlatinal background; the double desquamation; and the absence of complications.

KOPLIK'S SIGN IN A RECENT EPIDEMIC OF MEASLES.

"Measles is an acute infectious disease, distinguished by a characteristic eruption on the mucous membranes and skin."

It is to the enanthem or eruption upon the mucous membrane that I wish to call your attention. From the period of infection up to the time of the appearance of the enanthem there are no symptoms. With its appearance the patient is apt to feel slightly ill. A mild coryza; an upset stomach; a slight headache; some malaise or a little fever may be noted; and a glance into the mouth will, in a large percentage of cases, reveal the existence of the characteristic eruption. In its early appearances the eruption occurs in discrete spots, rose-red in color, with minute bluish-white centres on the otherwise normal mucous membrane of the mouth. Later, the eruption becomes more diffused, especially over the mucous membrane of cheeks and lips. Still later, when the eruption coalesces, the appearance is that of a diffused redness, with great numbers of bluish-white specks dotting the surface. The appearance of the discrete spots, when recognized, is a very valuable aid in diagnosis, for as they are pathognomonic of measles, the physician has a sure means of anticipating trouble, and the

child can be at once isolated and protected. The exanthem may not follow the enanthem for several days, yet when the appearance of the buccal mucous membrane is as above noted, the observer surely can prognosticate the exanthem. The value of an early diagnosis is often of great importance.

In 32 cases occurring in my practice this past winter, the discrete spots were recognized from one to three days before the rash appeared on the skin. In 28 cases, within twenty-four hours of the appearance of the exanthem (either before or after) the enanthem was present, but corresponded more fully to the later appearances; as noted above. (See Figs. II. and III. of Plate VII. of Koplik's *Diseases of Infancy and Childhood.*) In 8 cases no enanthem was seen at any time, though carefully sought; the only abnormal appearance being the diffused, more or less dull, red color of the mucous membrane. Of the 68 cases observed, it appears that 88.2 per cent. showed the pathognomonic preliminary sign; and it is my conviction that had the 8 last mentioned cases been observed at more frequent intervals, there would, at *some time*, have been seen at least a few of the characteristic signs.

DISCUSSION.

DR. KOPLIK.—Possibly in this case of scarlet fever a thing happened which is rarely noticed; in order to recognize the enanthem we must be certain that the mouth has not been washed, irrigated or sprayed. In my service there is a standing order that the physician in attendance must examine the mouths of all the children before they are washed in the morning. The point I would make is this: that in looking for the enanthem and recording statistics we should be certain that nothing has been done to the mucous membrane of the mouth which could possibly wash away these spots.

DR. GRAHAM.—About two years ago I was called to see a child four or five years of age in whom the rash was typical of scarlet fever. I made that diagnosis and reported the case to the Board of Health. The next day when I saw the child it was covered with a rash that was unquestionably measles. I told the parents that I thought the child undoubtedly had scarlet fever and now had developed measles. They were living in an apartment house where the people were not afraid of measles, but were afraid of scarlet fever. I am positive it was a case of measles superimposed on scarlet fever.

DR. ADAMS.—I have during the past twenty-seven years passed through several epidemics of measles and scarlet fever. About a year ago I saw the first case of measles superimposed upon chickenpox that I had ever seen, and this spring I saw for the first time a case of measles superimposed on scarlet fever. I was called in consultation and saw a child with typical symptoms of scarlet fever, the rash making its appearance promptly and the other symptoms being severe. The disease ran a typical course until the sixth or seventh day, when defervescence took place and peeling began. A little later there were symptoms which the doctor attributed to catching cold and which manifested themselves in the eyes and mouth, the eyes being congested and the tonsils inflamed. The next day the child seemed worse, and on the fourth day, the eleventh day from the beginning of the scarlet fever, the typical temperature rise occurred, and I saw the child with a temperature of 106° F. by the mouth. The peeling over the body was profuse, on the back and on the buttocks it was coming off in sheets, but there was an eruption present which was unquestionably measles. She recovered from both, but the convalescence was rather prolonged.

I had intended to present this same subject to this Society when Dr. Eaton's title came, and I had intended to borrow from Dr. Acker's service a couple of cases that occurred this spring. It is the first time in thirty years that I have seen this combination.

DR. ACKER.—I have had in the Children's Hospital this winter a great deal of scarlet fever and measles. During the last month I saw 2 cases: one child had a severe case of scarlet fever, beginning on March 20th, and on March 28th a well developed case of measles. In the other, scarlet fever began on April 11th, and on April 17th there was a well-developed case of measles. In the Garfield Hospital there have been several cases during the last three or four weeks that were diagnosed as scarlet fever and measles. Dr. Walsh, Health Inspector of Washington, states that it is the only time he has known this to occur in ten years' experience.

DR. FREEMAN.—We find in almost all the cases that these spots cannot be seen unless you have a very good light. I have therefore used, particularly in demonstrating to the students, a small hand electric light, which gives a better illumination than one gets by ordinary daylight.

DR. P. J. EATON (closing discussion).—In reply to Dr. Koplik, I think I have never had that hint given me before, but I take particular care in most of these cases of measles to have the mouth let alone until I see them each day. In this particular case I had the nurse let that mouth alone because I felt so sure that measles was coming; but I did not see anything that would resemble an enanthem at any time.

ACUTE NON-SUPPURATIVE ENCEPHALITIS IN CHILDREN.*

BY ISAAC A. ABT, M.D.,

Chicago, Ill.

Acute non-suppurative encephalitis is neither a rare nor new disease among children. Striking cases, however, are of interest. Attention was first called to this class of cases by Strumpell in 1884: "Cerebral palsies in children depend upon inflammation of the gray substance of the motor cortex. There is, therefore, an acute polioencephalitis analogous to acute poliomyelitis. Both depend upon the same infection which sometimes becomes localized in the brain, sometimes in the cord." Strumpell's publication aroused much interest, and subsequent investigations were made by Bernhardt, Wollenberg, Krast and Moebius in Germany; Marie in France; Ross, Abercrombie, Gowers and Ashby in England; Sachs, Peterson and Osler in the United States. With the evolution of the subject, it became evident that Strumpell was not entirely correct in the assumption that cerebral palsy in children was due to a single process, but to several pathological changes, such as cerebral hemorrhage, embolism and thrombosis, with resulting sclerosis, or porencephaly. Hence polioencephalitis was responsible for the cerebral palsies in only a proportion of the cases. Sachs stated that the disease, polioencephalitis, is open to question. He doubted the existence of such a morbid entity. During the last few years, however, many contributions have been made to the subject, and there remains no doubt that Strumpell's position was essentially correct, that acute encephalitis is responsible for a proportion of the cases of hemiplegia in young life. Freud estimates that one-third of all the cases of hemiplegia in children are infectious in origin.

In looking over a large number of histories of this disease, one cannot fail to be impressed with the fact that there are several clinical types of this disease. Batten believes that acute poliomyelitis and encephalitis are often associated and suggests as a classification: (1) Acute polioencephalitis superior, including those cases of paralysis in which the frontal, motor and occipital

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 31, 1906.

regions of the cortex are affected. (2) Acute polioencephalitis inferior, in which the nuclei of the cranial nerves are involved. (3) Acute poliomyelitis anterior, in which the gray matter of the anterior horns below the medulla is affected.

It is thought that the cord and brain may be affected at the same time, thus constituting a polioencephalomyelitis. Aldrich says that there is occasionally a disseminated encephalomyelitis complicating smallpox.

Two cases have recently come under my observation and constitute the subject of this clinical report.

CASE I.—E. V., a female child, aged five years, came under my observation July 31, 1905. She was born under normal circumstances; was breast-fed, progressed favorably during her infancy and never had any severe illness. The mother had taken the family away for a visit in Ohio. On the 25th of July the child fell ill with a severe headache. The mother thought the child was feverish. The pain in the head, which at first was slight, became more and more severe. During the first night of the illness the mother was of the opinion that the headache was intense. The child cried piteously, the mother carried her in her arms all night in an endeavor to quiet her. On the following day there was less restlessness and she did not speak to those around her. During the night of the second day the mother states that the child's head was thrown back and the arms were stiffened at frequent intervals. It was noticed that these rigidities of the neck and extremities seemed painful to the child. On the next day, Thursday, she became still more quiet, although there were paroxysms of pain during which she cried out loud. The father, who had come to take charge of her, was alarmed by the condition and concluded to bring her to Chicago, arriving July 31st. The child was at once taken to the hospital.

Status Praesens.—The child was semi-conscious; too stuporous to speak or take notice of anything. Temperature was 102.6° F.; pulse 138; respirations 30. Examination of the skull and scalp was negative. The pupils were equal and reacted both to light and distance; there was no paresis of the lids; a slight nystagmus, but no strabismus, was noted. The mouth and pharynx were negative. There was slight facial asymmetry due to paresis of the right side. The examination of the heart and lungs proved negative. The muscles of the upper extremities were tense and somewhat retracted. Palpation of the abdomen

elicited some rigidity of the muscles, with a slight retraction of the abdominal wall. The tendon reflexes were all increased, yet more markedly on the right side. The Babinski toe sign was present, also more markedly on the right side. The Kernig sign was not present. The child was having involuntary evacuations from the bowel and bladder. The examination of the urine was negative. Blood examination showed a moderate leukocytosis.

There was not much change in her condition for a number of days after her admission into the hospital. At times, particularly at night, she was slightly restless, though for the most part she lay in a stupor. She took a moderate amount of food. There were occasional twitchings in the right arm and leg, though voluntary movements were not noted. The pulse was sometimes irregular. The temperature varied from 99° F. in the morning to 103° F. in the evening, and followed no regular type. After she had been in the hospital about a week, the temperature showed a tendency to fall, and on the ninth day was practically normal. At this time she began to cry out, but did not appear brighter. On the 14th of August (twentieth day), however, she seemed to recognize her baby brother. On the 18th of August (twenty-fourth day) her mind was clearer and she took considerable food. She cried out at times, seemed to recognize those who entered the room, but did not speak. On the 19th of August (twenty-fifth day), for the first time, she moved her left leg, but neither her head nor hands. She recognized her mother by signs, but did not speak. On the 22d of August (twenty-eighth day) she gave evidence of general improvement. She smiled and nodded to those who came into her room. Her pulse was slow, but of good quality. On the 23d of August (twenty-ninth day) movement was noted in her left foot and leg. She seemed greatly pleased about this and laughed out loud. On the 26th of August (thirty-first day) she was removed from the hospital to her home. She seemed very happy; moved her left arm and leg, relished her food, but was still unable to speak. On the 31st of August (thirty-sixth day), for the first time, movement appeared in the fingers of her right hand. During this interval she used her left arm and leg with ease; participated somewhat with her brother and sister in their play, and they endeavored to teach her the deaf and dumb language, in which they partly succeeded. She enjoyed this idea, and made finger signs in return, thereby indicating her wants. The mother states that on September 5th (the forty-first

day) she tried to talk, but describes the attempt made as pitiful. A few days later she ventured the remark, "take me." It was a very great effort. Improvement was slow. The use of her left arm and leg returned only after a protracted time. The paresis of the right side of the face improved only slightly. Her speech improved gradually, though even now she talks with some difficulty. She hesitates and stammers, and her speaking vocabulary is not large. The upper extremity of the right side is used with some difficulty. There is some contracture in the hands and in fingers. The elbow joints are movable. She is awkward in the use of the arm and hand. The patellar reflex of the right side is more active than the left. Ankle-clonus is present. There is no considerable atrophy of the right leg or arm; the foot hangs in equino-varus position; the gait is decidedly of a hemiplegic type. She is irritable and extremely shy in the presence of strangers. Sensation everywhere is normal.

The points in this case may be summed up briefly as follows:—A previously healthy child was taken suddenly ill with headache, fever, and increasing unconsciousness, a condition which continued for about ten days. When she awoke from the stupor she was found to be suffering from a generalized paralysis. The use of the left side recovered itself in a very few days. She was and is now suffering from a complete right-sided hemiplegia. Her intelligence does not seem to have suffered to any marked degree. As I saw the child on the first day, it impressed me much as would a case of tuberculous meningitis, and I am free to confess that this impression was retained throughout the first week of the illness. Respecting the wishes of the father, I did not make a lumbar puncture. It was only when the child aroused somewhat from the stupor that we began to suspect the true nature of the disease, which suspicion grew to conviction with the appearance of the hemiplegia.

CASE II.—Male child, five years of age; was without serious illness until the present attack.

Family History.—The maternal grandfather died at the age of sixty-six years from heat prostration. The maternal grandmother met with an accidental death at the age of thirty-one. The paternal grandparents lived to be very old. The little patient's father lost two sisters from tuberculosis. The father himself has always been well. The mother is a very large, robust

woman. She says she never had any serious illness, although all her life she lacked in endurance.

The boy took sick on the first day of September, 1905. At the dinner table he did not seem quite himself. He appeared exhausted; his face became pale; he was listless, and had to be carried to bed. Although this was quite unusual, nevertheless the mother attributed it to hard play. The next morning he vomited several times, but did not create the impression of being seriously ill. The pulse was 120 and the temperature 101° F. He was drowsy, though he could be readily aroused. The mother thought he did not act differently from many another child suffering from fever. On this day the parents were invited to a friend's farm in the country. Notwithstanding the little fellow's indisposition, they took him along. He continued to be drowsy, refused food for the most part, and vomited occasionally. This was the third day of his illness. In the evening the boy did not seem any better and the parents returned with him to the city. He acted excessively nervous, was very irritable and fretful, and it was noticed by the mother that the left side of the face was slightly drawn and a slight tremor appeared in the right hand. His condition was not considered worse on the night of arrival home, since he slept nearly all night. On Monday at five o'clock P.M. he seemed decidedly worse. His temperature was 104° F.; his pulse was very rapid. He lay in bed in dorsal position, unconscious, though he gave an occasional cry. There were involuntary passages from the bowels and the bladder. On Tuesday (the fifth day) he was unable to speak and was stuporous. He vomited occasionally, and threw himself about. At this time it was observed that he had a paresis on the left side of the face, and it was suspected that the right arm and leg were paralyzed. He lay in this condition of stupor until Thursday (the seventh day), when he awakened for an hour. On Friday he became brighter, taking notice of some figures on the bedspread and calling attention to same. From this day on he was without fever. His recovery was gradual. He shortly regained his speech, and in three weeks more was able to walk. The mother called attention to the fact that, although improved and up and about, he nevertheless remained extremely nervous. He became greatly excited in the presence of a company of people, or when taken downtown among large crowds. The slightest physical effort seemed to prostrate him.

I saw him for the first time on the fourth day of his illness, and noted a well-developed, well-nourished boy in a state of unconsciousness and with a considerable fever, varying from 102° F. to 104° F. The examination of the head and scalp was negative. Inspection of the ears by a specialist showed them to be normal. The pupils were regular, reacted readily to light and accommodation. The examination of the eye grounds proved negative. The left half of the face was drawn slightly. The tendon reflexes of the arm and leg on the right side were somewhat more brisk than those on the left. The urine was excessively acid and showed slight traces of albumin.

In the course of the disease the little fellow showed progressive improvement. There is now a very evident paralysis of the left half of the face. If he smiles or attempts to whistle, or even to speak, left facial paresis is unmistakable. The hand and arm on the right side have recovered to a very considerable degree. There is a slight flexion of the fingers, though he uses his hand with great facility. There is some limp when he walks, though there seems to be very little spasticity of the right leg. He sometimes complains of a pain in the right foot and hand, probably the so-called posthemiplegic pain. He is a bright little fellow, quick and nervous in his actions, talks about almost every subject in a very intelligent way. He makes the impression of being mentally normal.

This case presented such difficulties in diagnosis which confront one in the incipient stages of this disease. During the first forty-eight hours one would have thought of some acute infectious process; for example, an obscure pneumonia or almost any infectious disease in process of development.

The case is of additional interest in that it shows undoubted evidence of a crossed paralysis with the lesion located in the pons, and belonging to that variety already referred to as polioencephalitis inferior.

Etiology.—The causes of acute non-suppurative encephalitis may be summed up briefly in the words of infection and intoxication. Acute alcoholism possibly plays a rôle in adult and older children. In one of Wernicke's cases, poisoning with sulphuric acid was suspected. In other cases, nicotine has been thought of as a factor. The infective source is the most frequent of all in the encephalitis of children. It is well known that an encephalitis may develop during the course of a cerebrospinal meningitis.

In nearly a third of all the cases of hemiplegia in young life, it has followed one of the acute infectious diseases, occurring either at the height or the defervescence of the disease (Freud). There is probably no infectious disease known which has not been reported at one time or another as having been followed by cerebral hemiplegia. Measles and scarlet fever, according to Freud, head the list. Next in order come smallpox, German measles, whooping-cough, diphtheria, croup, follicular tonsilitis, morbus maculosis, dysentery, pneumonia, typhoid fever, mumps, intermittent fever, chorea with endocarditis; even vaccination is said to have caused hemiplegia in several cases. Perhaps the best known and the best studied of all the various infections producing encephalitis is influenza. The question is not altogether settled whether the influenza bacillus itself or its toxin produces the cerebral inflammation.

Pfuhl succeeded in finding influenza bacilli in the central nervous system of cases dying of a severe nervous form of influenza. Nauwerck succeeded in finding the Pfeiffer bacillus in a case of influenzal encephalitis in the brain and in the ventricles. Cantani has injected cultures of influenza bacillus beneath the dura of rabbits, and succeeded in producing meningitis and encephalitis. He found, too, that the same result could be produced by the injection of dead cultures as well as living cultures. The inference, therefore, is that encephalitis is due to the action of a toxin produced by the bacilli on the brain substance. There is a large number of cases in which encephalitis occurs as a primary infection; that is, where no relation can be traced to antecedent disease. In the two cases which I have cited evidence of any pre-existing infectious disease is absolutely lacking.

All authors mention trauma, such as a blow on the head or a fall, as having some direct remote relation to the disease. The developmental condition of the brain, Heubner thinks, has an influence on the causation of the disease. He finds that it is much more frequent during the first and third years of life, though it does occur at almost any age during childhood. In some of the cases, syphilis is a predisposing, if not an exciting, cause by giving rise to an endarteritis, or some other form of syphilitic degeneration; such an area might also become secondarily infected. An ulcerative endocarditis may cause an embolic process infectious in character.

PATHOLOGICAL ANATOMY AND HISTOLOGY.

Any portion of the brain may be affected, though, as it has already been stated, the cortex (superior encephalitis), the basal ganglia and the region of the medulla (inferior encephalitis) are selected areas. The cerebellum is seldom affected, although Batten recently reports a case typical as to its clinical findings and verified by autopsy. The disease is usually focal in character, though the foci are multiple and disseminated. The most striking point in examining an area of inflammation is the change of color apparent in the gray substance. It is grayish-red or violet or brownish-red, or the white substance is streaked with red. Sometimes there is a uniform discoloration or the brain substance appears streaked or spotted. On section of the brain there appeared red or yellow points which have been compared to flea bites by older authors and described as being surrounded by zones of swelling and softening. When the lesion is in the cortex the neighboring pia is usually injected and may be adherent.

Brooks, in a report of a case of non-suppurative encephalitis, summarizes the pathological findings:—

“(1) Cerebrospinal meningitis, probably secondary to cerebritis, and of the ‘cellular’ type as described by Delafield and Pruden.

“(2) General non-septic cerebritis affecting all parts of the cerebrum, but most marked in the cortex and particularly so in that of the motor areas. The disease is characterized pathologically by perivascular round-cell infiltration, dilation of the lymph spaces and by areas of neuroglial proliferation. The changes are further identified as inflammatory by the presence of occasional plasma cells.

“(3) Degeneration of many of the ganglion cells of the cortex. From the character of the lesions of these cells it is inferred that in most cases the changes have been of recent origin. Possibly some are postmortem alterations.

“(4) Degeneration of many of the fibres arising from the large pyramidal cells of the cortex, most marked in those derived from the motor areas.

“(5) Diffuse degeneration affecting many of the fibres passing through both internal capsules.

“(6) Inflammation of the tissues of the cerebellum, of much less marked degree than in the cerebrum, but apparently of the

same character and accompanied by similar, but much less extreme, changes in the cells and fibres.

“(7) Degeneration of many of the descending fibres of the pons and medulla.

“(8) Degeneration of the chief descending tracts of the spinal cord with degeneration of occasional fibres in ascending tracts, possibly aberrant descending fibres.

“(9) Slight, probably secondary cytoplasmic degeneration of the ganglion cells of the anterior horns of the spinal cord.”

The results of acute encephalitis may terminate in local necrosis or formation of scar tissue. Glia cells are proliferated and connective tissue formed. This results in a local induration, referred to by the older writers as brain sclerosis. The process may be very extensive and lead to atrophy of a part or even an entire cerebral hemisphere. In other organs, lesions are sometimes found as the result of the general infection. The spleen is at times enlarged; hemorrhages occur into intestines and mesentery, while a parenchymatous degeneration of myocardium and acute nephritis may be present.

SYMPTOMATOLOGY.

Strumpell, in his “Lehrbuch für Specielle Pathologie und Therapie, 1893,” speaks of acute encephalitis as occurring in children between one and four. The disease is marked by sudden onset, with feeling of illness and fever. Shortly nausea and vomiting, or general cerebral disturbance in the form of coma and convulsions, may occur. This condition may last one or two days, or it may last one to three weeks. The children may recover from the disease gradually, but paralysis in some form will remain. After the paralysis has existed a while, examination usually shows that both extremities of one side are affected, the arm more than the leg. There are no sensory disturbances. The growth is to a certain extent retarded. The muscles are somewhat atrophied. There is no reaction of degeneration, but almost always more or less muscular contraction. Variations from this course sometimes occur. Children occasionally die suddenly before the diagnosis can be positively made. Chronic forms sometimes occur. In these cases, the initial symptoms may last one or two months. Convulsions occur frequently, resulting from the new inflammatory areas. Strumpell believes this disease is anal-

ogous to acute poliomyelitis; the initial symptoms are so similar that in a given case it might be difficult to decide whether a cerebral or spinal paralysis would ensue. In another group of cases, which belongs more particularly to the inferior polioencephalitis group, the acute infectious diseases very often precede the onset of the encephalitis. One of Leyden's cases of this type is of interest. A fifteen year old boy fell suddenly ill with headache, nausea and dizziness, and on the third day these symptoms were augmented by fever, vomiting, difficulty in swallowing; the symptoms progressed, and on the sixth day of his illness, in addition to the headache and dizziness, he developed rigidity of the neck, ataxia, paralysis of both facial nerves, paralysis of the hypoglossal, of the soft palate and vocal cords. He also had a mild fever. His pulse was slow; there was no involvement of the eye muscles at first; later on he showed paralysis of the abducens. He died on the eleventh day of his sickness, and the autopsy showed a pneumonia with an encephalitis in the region of the medulla.

Another case of encephalitis located in the pons, reported by Oppenheim, was that of a twelve-year-old girl, who suffered from a swollen face, with pain on the left side. She also suffered from headache. Very soon she became mentally dull. There was no fever; there were no changes in the eye grounds. Some time later, however, the left facial nerve became entirely paralyzed, with a hemiparesis and incoördination of both arms, though most marked in the left arm. The tendon reflexes became increased; the soft palate was paretic; articulation was difficult. All of these symptoms pointed to a focal lesion involving the pons in the region of the left facial nerve, and extending so as to involve the sensory and left pyramidal tracts.

In the majority of cases the disease begins in the midst of perfect health, like acute infection, and in the manner already referred to. Convulsions may occur; they may be of the Jacksonian type, or they may be general. The vomiting may be persistent, and the child remain in a febrile, stuporous, or comatose condition for several days. The temperature is variable; the coma rarely complete. At first sight, one is inclined to think of meningitis or perhaps some other acute infectious disease which is in process of development, with decided nervous symptoms; but in a few days the fever declines; the child becomes more quiet, and thus, on the fourth or fifth or perhaps the tenth day of the disease, the paralysis becomes evident. There may be an arm in-

volved, a complete hemiplegia, or a crossed paralysis due to a lesion in the pons, as has already been referred to.

At the very outset the reflexes may be diminished, and a generalized paralysis of all of the extremities seems to be present. In several days, however, the unaffected extremities begin to regain their motor function, and later on the child begins to move to some extent the affected arm or leg. At this time the reflexes on the involved side are usually increased, and the Babinski toe sign becomes manifest.

In addition to the symptoms already enumerated on the part of the nervous system may be mentioned the nutrition of the skin, which is affected. It is likely to appear blue on account of capillary and venous stasis in the hand and foot of the affected side. Such an extremity is cyanotic; sometimes slightly edematous; and not infrequently cooler than the limb of the other side. The skin is dry; the sweat glands less active on the affected side. Very often and particularly in the milder cases, the intellect of the child remains practically unimpaired. At other times, where the lesion is extensive, more or less permanent mental deficiency supervenes, even to the production of idiocy. Such a disturbance of motor speech may persist in varying degree. In many cases epileptic convulsions develop from which recovery is impossible.

Schultze first called attention to the fact that deaf-mutism may result from acute encephalitis. He cites the following case:—A two and one-half year old child, healthy, received a blow on the head. The same evening it cried for several hours, and on the following night had convulsions with slight fever. For two days thereafter it was stupid, restless and refused food. On the fourth day, showed some improvement. Ten days after the beginning of the disease it was found that the child was deaf; also that it had slight strabismus; no other paralysis existed. The deafness continued, although the middle ear was normal.

In some of the milder cases, the paralytic symptoms may entirely disappear, and Medin reports a recovery without permanent paralysis. Comby also reports a case in a seven year old girl cured without a trace of paralysis.

Complete recoveries have been reported after slight attacks, usually slight paralysis remaining.

The terminal of the cases may be summarized as follows:—

(1) A small proportion of the cases do not survive, death occurring in the second or third week or as early as the first day.

(2) If the encephalitis occurs during acute infectious disease, death may result from cerebral conditions or from the original disease.

(3) Some cases improve within a few days, without any signs of disease after six or eight weeks. There is always a liability to hemiparesis of one side of the body or to epilepsy.

(4) The majority of cases with initial flaccidity give rise later to the spastic type of hemiplegia.

The diagnosis during the acute stage is nearly always difficult. One is inclined to think of an acute infectious disease, on the one hand, or a meningitis on the other. The diagnosis may be confused with that of a tuberculous meningitis. Spinal puncture in these cases is of but little assistance. If hemiplegia or cranial nerve paralysis occurs, followed by returning consciousness, the diagnosis is rendered comparatively easy. In short, if in the midst of absolute health, or in connection with an acute febrile disease, the child during the first years of life is seized with recurring convulsions, or vomiting, if a hemiplegia results, or if later psychic disturbances, contractures, hemichorea, epilepsy or idiocy develop, the diagnosis of encephalitis can be made with reasonable certainty.

REFERENCES.

- Strumpell. *Lehrbuch für Speciellen Pathologie und Therapie*, 1893.
 Freud. *Infantile Cerebral Zämhurgen*, 1897.
 Batten. *The Lancet*, Dec. 20, 1902.
 C. T. Aldrich. *American Journal of Medical Sciences*, February, 1904.
 Pfuhl. *Deutsch. Med. Wochenschrift* No. 6, 1896. *Deutsch. Med. Wochenschrift* No. 29, 1905. *Berliner Klinische Wochenschrift* No. 39, 1892.
 Nauwerck. *Deutsch. Med. Wochenschrift* No. 25, 1895.
 Heubner. *Kinderheilkunde*, 1906.
 Brooks. *Medical News*, Aug. 9, 1903.
 Schultze. Quoted from Heubner *Kinderheilkunde*, 1906.
 E. Reymond. *Jahrbuch f. Kinderheilkunde* No. 44.
 Oppenheim. *Enceph. Specielle Pathologie und Therapie* Nothnagel, 1897.

DISCUSSION.

DR. GRIFFITH.—I hope some day to report a case which illustrates the fact that in rare instances there may be a combination of poliomyelitis with inferior polioencephalitis. Spiller has proven by postmortem studies that this can occur. One would not expect, of course, to get the spastic symptoms seen in Dr. Abt's case.

Clinical Memorandum.

A CASE OF CONGENITAL HYDRONEPHROSIS, DILATATION OF URETERS AND HYPERTROPHY OF THE BLADDER IN AN INFANT OF SIX WEEKS; WITH REMARKS ON THE ETIOLOGY OF THE CONDITION.*

BY D. J. M. MILLER, M.D.,

AND

C. Y. WHITE, M.D.,

Philadelphia.

J. S., a breast-fed male infant, six weeks old, had been well, according to the mother, without urinary or other symptoms, until the age of three weeks, when an easily reducible right inguinal hernia was discovered. Three weeks later, on the morning of admission to the hospital, the hernia became irreducible and the abdomen distended. During the evening of that day the child vomited once, and throughout the night had much pain.

The next morning, following a dose of castor-oil, the bowels moved several times and urine was voided; but the abdominal distension continuing, the patient was brought, in the evening, to the Children's Hospital.

On admission the child's condition was serious: it was restless, with anxious expression; the temperature was 99°F.; the respirations, 60-70; the pulse, 130-140. The child was well nourished. The abdomen was enormously distended and everywhere tympanitic, except in the hypogastrium, where, from symphysis pubis to a point midway to the umbilicus, decided dullness, without fluctuation, could be demonstrated. There was no dullness in the flanks, no movable dullness and no fluctuation. The hernia was complete, but reducible without effort. After much difficulty and some force, catheterization was performed by Dr. H. Siter (acting for Dr. H. R. Wharton), and two ounces of a clear urine were withdrawn, a large silver catheter being used.

This did not dissipate the hypogastric dullness, and a rectal ir-

*Specimens presented at meeting of Philadelphia Pediatric Society, November 13, 1906.

rigation brought away only a small amount of fecal matter, but no gas. Eserin ($\frac{1}{300}$ gr., hypod.) and 15 drops of paregoric (by mouth) were then given, and later high turpentine enemas. This resulted in the expulsion of considerable gas and several liquid stools. Marked reduction of tympany and greater ease in breathing followed, so that toward morning the infant was comparatively comfortable. The next morning, about 10 A.M., the abdomen again became tense, and, the dyspnea increasing, Dr. H. R. Wharton operated at noon. On opening the peritoneum a colorless fluid gushed out with considerable force. The peritoneum appeared healthy (there was no peritonitis), and no tumor could be discovered. In both flanks, cyst-like swellings could be palpated, and were thought to be connected with the kidneys. The patient's condition being such, at this time, as to preclude further exploration, the wound was closed, death occurring in a few hours.

The examination of the urine removed by catheter revealed the following:—No sugar; considerable albumin; hyaline and blood casts; a few red blood corpuscles.

The fluid from the abdomen at the time of the operation showed the following:—No sugar; albumin; three milligrams of urea; microscopically, a large motile bacillus and numerous leukocytes. Stained smears from the sediment of this fluid showed numerous leukocytes and numerous bacteria. Cultures showed a mixed infection.

Autopsy by Dr. C. Y. White. *External Appearances.*—Body of a well nourished infant. Skin wound, 5 cm. in length, in the median line between the umbilicus and the symphysis pubis. Elsewhere the body was normal, except for a rather marked prominence of the abdomen.

Internal Appearances.—The organs were generally normally situated; the stomach and intestines greatly distended with gas; the peritoneal cavity contained an excess of cloudy fluid, and, in the dependent portions, about 15 c.cm. of pus; on the serous coats of the intestine there was a slight fibrinous exudate, which was especially marked along the cecum and the ascending colon. The lungs and heart were normal, with the exception of slight congestion at the base of the right lower lobe. The liver showed slight congestion and fatty changes, the spleen was very slightly congested, the stomach was distended with gas, but was otherwise normal; the intestines contained gas and a slight amount of semi-

fluid fecal matter, the external coats in places showing recent peritonitis.

Urinary Apparatus.—Right kidney, 5.5 x 3.0 x 2.5 cm.; shape, normal; consistency, firm; capsule slightly adherent to the organ and unusually adherent to the surrounding organs; surface, pale. *Section Surface.*—The cortex was slightly thickened, dull and pale; the medulla was diminished in thickness in areas, but of normal thickness elsewhere; the pelvis was unusually dilated and contained fluid. The left kidney was about the same size as the right organ, and showed the same general pathologic changes.

Both ureters were greatly dilated, measuring in their greatest diameter 1 cm. They were tortuous throughout their course from the kidney to the bladder wall, the folds in many places making marked angulations, bulbous dilatations and constrictions. Sections of the angulations showed the walls on the short side of the turn to make valve-like projections into the lumen. Both ureters were partly filled with cloudy fluid

Bladder.—The bladder was contracted, hard, and rather prominent in the anterior part of the pelvis. Section showed it to be empty, the rugæ prominent, the mucous membrane greatly congested and swollen. The muscular wall measured in its greatest thickness 0.7 cm. The prostate gland was not enlarged.

Penis.—The penis showed a marked phimosis, which, however, could be easily reduced. Section of the urethra showed the mucous membrane greatly congested and swollen, but without cysts or valvular folds.

HISTOLOGICAL EXAMINATIONS:—

Kidney.—The sections of the kidney show the tubules of the pyramids, and, to a slight extent, those of the cortex, dilated and partly filled with granular exudate. The connective tissue between the tubules of the medulla and pyramids was increased. The epithelium of the tubules of the cortex was generally cloudy, and in places distinctly granular.

Bladder.—Muscle nuclei are generally hypertrophied. The connective tissue fibers in and between the muscle bundles are increased; the mucous membrane was congested and slightly infiltrated with round cells.

REMARKS BY DRS. MILLER AND WHITE.

This case does not differ from the majority of congenital hydronephroses in that the diagnosis was not made during life.

As in our case, genitourinary symptoms are usually wanting, and the malformation is unsuspected *intra vitam*, being first revealed on the autopsy table. There is often no abdominal tumor, and the patient dies of some other disease, which, perhaps, would not have been fatal had it not been for the renal condition.

In the case now reported death was immediately due to the embarrassment to respiration consequent upon the enormously distended abdomen, which, in turn, was dependent upon the ascites, as there was no actual tumor; while the peritonitis found at autopsy was a direct result of the operation. Our patient was brought to the hospital for the relief of a strangulated hernia, but the latter was quite reducible at the time of admission, while the absence of vomiting, and the ease with which fecal evacuations were induced, disposed of the idea of intestinal obstruction. Because of the absence of tenderness, of fluctuation and of flankal and movable dullness, and of the presence of marked tympany, except in the hypogastrium, the existence of peritoneal fluid was not suspected, and the diagnosis remained a matter of conjecture up to the time of operation.

The greater number of infants with congenital hydronephrosis die in the early months of infancy. In uterine life the dilatation of the kidneys and ureters, with the subsequent abdominal distention, may be so great that dystocia may result. In others, death of the infant may precede birth. In Holt's 10 cases, 6 died before the sixth month of life, and only 2 lived to be two years old. Henry Morris refers to a child who lived to be five and one-half years old; an unusual event.

Obstruction of some nature somewhere in the genitourinary tract must be present to cause the marked mechanical and, subsequently, the pathologic changes observed in this condition. Yet no obstruction may be found, even though extreme dilatations of the pelvis of the kidneys, ureters, the bladder and the urethra are present at the time of operation or at the autopsy. Fortescue-Brickdale reports 3 such cases, while in Holt's 10 cases only 3 showed definite obstructions.

The study of the literature on this interesting condition shows a variety of conditions actually present and responsible for the obstruction in some of the cases reported, other conditions associated with the genitourinary changes, and probably constituting contributing causes, and, finally, theories that have been

advanced to explain the changes so frequently observed in congenital hydronephrosis.

(1) Conditions outside of the ureter that may produce hydronephrosis.

(a) Inflammatory changes along the course of the ureter in the abdomen or in the pelvis. (b) Tumors pressing upon the ureter or other part of the urinary apparatus. (c) Anomalous distribution of the renal artery.

(2) Conditions within the genitourinary tract producing hydronephrosis.

(a) Coagulated blood, either in shreds or in a distinct clot. (b) Calculi or uric acid dust. (c) Parasites. (d) Twisting or torsion of the ureter from a movable kidney. (e) Absence or blind ending of the ureter. (f) Duplicity of the ureters, with a blind ending of one ureter. (g) Valve-like folds or cysts of the mucous membrane, either of the ureter or of the urethra. (h) Obliquity or angulation of the penis. (i) Hypertrophied bladder wall. (j) Stricture of the ureters, either along their course or at their entrance into the bladder. (k) Dilatation of the ureter, with subsequent angulation of the walls. (l) Phimosis.

In the case here reported, if a simple mechanical cause produced the lesions, it must have existed somewhere in the urethra or been the result of the phimosis. The phimosis was easily reduced, and the outlet was of sufficient size, so that one could scarcely assign the marked changes in the bladder, ureters and kidneys to such a cause.

At the time of the autopsy no urethral fold or adhesion could be found, nor was there any foreign body present within the urethra or the bladder. It is barely possible that, if a fold-like projection had existed prior to the rather forcible catheterization, it was effaced by the dilatation of the canal during this act.

At the autopsy the following conditions were present: Hypertrophied bladder wall, stenosis of the vesical termination of the ureters, angulation, with dilatation of the ureters, and hydronephrosis. Any of these may have been primary, or may have followed some other primary cause not discovered; as they existed, each contributed a part in continuing the process.

Of these conditions, the hypertrophy of the bladder wall stands out most conspicuous, and would, therefore, be suggestive as the primary lesion and the cause of the subsequent hydronephrosis. The histology of the bladder wall seems to show a slight in-

crease in connective tissue throughout and between the muscle bundles. The terminations of the ureters in the bladder were greatly stenosed, barely permitting the passage of a small broom-straw. This latter condition could be easily explained by the hypertrophy of the muscle bundles and the overgrowth of the connective tissue in the bladder wall compressing these outlets.

Such a theory has been advanced by Fortescue-Brickdale to explain cases similar to the one here reported, where no definite cause for the hydronephrosis could be demonstrated. He suggests that the primary cause of the condition may lie in the bladder wall, and consist of a hypertrophy, which may be compared to that of the pylorus in congenital hypertrophic stenosis, and which may be due to disordered innervation; the spasmodic contraction of the thickened walls compressing the orifices of the ureters sufficiently to account for the backward pressure on the ureters, with dilatations and subsequent changes in the kidneys. Support is given to this view in the origin of other congenital deformities (club-foot, wry-neck) from spasmodic action of the *fetus in utero*. This theory, as previously stated, seems applicable to the above case from the fact that both sides were involved, *i.e.*, the ureteral dilatations, stenosis of the outlets of the ureters and back pressure changes in the kidneys, without demonstrable obstruction in the urethra or a severe form of phimosis.

ARCHIVES OF PEDIATRICS.

MAY, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

Contributors and Correspondents, see page III.

MENTAL FATIGUE IN CHILDREN.

Not even our children can escape the mental overstimulation and overwork of this rapid age. The child shows these effects in various ways, partly mental and partly physical. Overpressure in school, together with one of its serious consequences, chorea, has been discussed in these pages; but the whole subject of overwork could well bear consideration every spring, for it is at this period of the year that one encounters the greatest number

of such cases. Chronic fatigue and malnutrition of the cells of the central nervous system are apt to result from the prolonged activity of the winter, accompanied as it is by less fresh air, less sunlight, and less outdoor exercise than during the other seasons.

Fatigue is of two kinds: normal healthy tire and overfatigue or weariness. The causes of normal fatigue are the expenditure of nervous energy in work and the accumulation of waste products in the cells and in all the body fluids. Hodge has shown that when the nerve cells are fatigued they shrink in size, their nuclei and nucleoli become shriveled, and the nutrient granules in the cell protoplasm disappear. After sufficient rest all these cell elements resume their normal condition; the nucleus and the cell become again plump and the lenticular granules reappear.

Donaldson says that after recuperative sleep the cells are full-sized and granular, the blood flows with a medium pressure through the nerve centres: slight stimulation elicits a ready response and there are general sensations of vigor and well being. From the beginning of the day the process of running down goes on, all the stimuli from without hastening it. In general, there is a tendency to run down at mid-afternoon, with a return of vigor later in the day. At the accustomed hour for retiring the evening supply of blood diminishes and depends on the waste substances in the blood produced by the active cells. These substances accumulate faster than they are removed and hinder activity. At beginning of sleep they are abundant, the stored material in the cells is small, and the cells are variously shrunk. At the end of two or three hours the toxic products are removed and the sleeper is readily awakened, though recuperation has just begun.

For thorough recuperation of any fatigued cell, time (longer or shorter), rest and proper nutrition are essential. The removal of the toxic substances requires also time and rest. Over-fatigue is induced when the process of restoration is for a long time only partial. Deficient nutrition of the cell and the accumulation of irritating toxic substances contribute to irritable weak-

ness and "nerves." These facts constitute the scientific basis for the "rest cure" in neurasthenia.

Normal fatigue is shown in the school child, according to Smith Baker, by a weakening of attention and perception, loss of self control, lessened work-rate and lengthened time reaction to all stimuli. Usually certain more or less painful feelings accompany all effort. Within normal limits no harm results from this fatigue; if work is continued nature asserts herself and the child falls asleep.

Signs of overfatigue are a drawn expression of the angles of the mouth, wandering eyes; there are apt to be headaches, disturbed sleep, perhaps night terrors and morning irritability; there may be emaciation and perhaps hysteria or chorea. There is no concentration of attention and memory is capricious; there is painful nervous tension and a sense of ill-being. Older children may become morbidly dreamy, introspective, self depreciative and develop a "New England conscience."

In actual practice the less serious phases of mental over-fatigue are the ones met with. In infants, fretfulness, restless sleep, indigestion—all may result from being too much entertained, especially if overstimulated just before being put to bed at night. The father and the grandparents are apt to be the greatest offenders in such cases.

In children of kindergarten age, bad temper, fretfulness and frequently enuresis are often due to the excitement and overstrain of the kindergarten, especially if the children are the youngest in their classes. In older children, anemia, headaches (without defective sight), morning languor, subnormal temperature, lack of ambition and failure to gain in weight are signs that should call the physician's attention to the amount of school work being done, as compared to the amount of sleep, of fresh air, of rest and of wholesome food with time to eat it. With any child, if the fatigue of the day's work is not entirely recovered from during the night's repose, too much work is being attempted for that child.

Bibliography.

The Nursling: The Feeding and Hygiene of Premature and Full-term Infants. By **Pierre Budin**, Professor of Obstetrics, University of Paris; Director of the Clinique Tarnier, etc. With an Introduction by **Sir Alexander R. Simpson, M.D., LL.D., D.Sc.**, University of Edinburgh, and an American Introduction by **Walter Lester Carr, A.M., M.D.**, New York. One hundred and eleven diagrams in color and other illustrations. Pp. 200. Price \$6.00. New York: Imperial Publishing Company.

This monograph on the nursing infant is a veritable encyclopedia of information concerning the nutrition of the young infant; and is based entirely upon the personal experiences of Professor Budin. The scope of the work includes every phase of the feeding life of the newborn and young infant, detailed attention being given to premature infants and to full term infants of low vitality. Dr. Budin does not consider that a physician's duty consists merely in ushering the infant into the world, but it includes the caring for its nutrition in the best manner during the first year of life. To that end, he is a firm believer in encouraging mothers to nurse their children, and gives explicit directions for the care of the mother and the care of the wet nurse. One of the most valuable parts of the book is that upon the management of breast milk and especially the care of and the *régime* for the wet nurse. It is insisted, and rightly so, that many wet nurses fail because the infant is unable to give sufficient stimulus to the breast by adequate nursing. In this case, Dr. Budin advises that the wet nurse have in addition to her charge either her own infant or some other vigorous baby whose nursing will stimulate adequately the activity of her breasts. The book presents an elaborate study of the care and nutrition of the nursing baby, scales being in constant requisition to show the rate of gain in weight and to show also the amount of milk taken at each feeding. The influences on the infant of menstruation, pregnancy and various diseases are fully set forth; also the effect of underfeeding and overfeeding. There is a chapter on mixed feeding, that is, the use of both bottle-food and breast-milk, and final chapters upon the use of cow's milk for artificial feeding, and upon Consultations for Nurslings, in which Dr. Budin was a pioneer.

To the reviewer, it would seem that nothing better than this book has come to press on the subject of the nursing infant and

the management of breast milk. Dr. Budin's experience is that of an accoucheur who is extremely interested in the babies whom he has brought into the world, and it would seem probable that his experience is greater with nursing infants than with those that are artificially fed. His usage with bottle-fed infants is to give them undiluted whole milk sterilized; and his chief concern is that the milk should contain 4 per cent. butter fat and that it should be sterilized; he does not believe in dilution of the milk or feeding it raw, therein differing from his colleague of the Gouttes de Lait, Dr. Dufour, who uses diluted milk, and from the best American observers, who believe that raw milk is far more digestible than sterilized milk. Small quantities of this undiluted sterilized cow's milk are given to the newborn infant. This is increased as rapidly as the weight curve of the infant seems to demand.

Numerous charts in color illustrate the text, giving graphic presentation of the relation of the food taken to the increase in weight. The book is a very valuable one for every physician who sees young infants, and should certainly have a place on the shelves of every pediatricist and accoucheur.

Imitation Affections.—Schoedel describes (*Jahrbuch für Kinderhk.*, Vol. LXIV., No. 4) a school epidemic of shaking of the hands and arms, rendering writing impossible, affecting 21 out of 35 children in two rooms. He reviews the history of similar epidemics, accepting the influence of mere imitation as the cause. The first cases occurred after an account in the papers of a similar epidemic in a neighboring town, and the other cases followed among those children who could see over the shoulders of the affected children and watch their writing. Isolation has been generally employed in such epidemics, but the results were better when no attempt at isolation was made and the children were given treatment with the faradic stream with a current as strong as they could tolerate. This put an end to the epidemic in from eight to ten days. With isolation and the closing of the schools, sometimes from eight to ten weeks elapse before such an epidemic is finally stamped out. The children in his charge dreaded the electric treatment. He thinks that hysteria and simulation can both be excluded in these "imitation affections."—*Journal of the American Medical Association.*

Society Reports.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, November 13, 1906.

ALFRED HAND, JR., M.D., PRESIDENT.

A CASE OF CONGENITAL HEART DISEASE AND A CASE OF NECROSIS OF THE ALVEOLAR PROCESS FOLLOWING ACUTE INFECTION.

DR. ELEANOR C. JONES showed a patient with congenital heart disease. The birth of this boy, now five years and a half old, was instrumental. He was undersized, and seemed physically and mentally deficient. He had walked only within the last six months. It was first noticed that he was a blue baby at the age of a week. The finger-tips were blue and clubbed, and he was dyspneic on exertion. The right side of the heart is enlarged, the apex beat being in the fifth interspace, nipple line. There is no thrill; but a systolic murmur, neither loud nor rough, is heard over the base of the heart. It is especially distinct at the second cartilage on the left side, and is not transmitted to the axilla nor to the vessels of the neck. The second pulmonic sound is not accentuated. Dr. Jones made a probable diagnosis of stenosis of the pulmonary orifice and perforate septum ventriculorum.

Dr. Jones also showed an infant with necrosis of the alveolar process of the superior maxilla, just above the incisor teeth, and also involving the palatal process. The history of this child, twenty-three months of age, pointed to an acute infection; and both syphilis and tuberculosis could be excluded as causes. The ulceration of the mouth began about two weeks previously to the necrosis. Prompt curettage was done, and the wound rapidly healed. It now shows a large cavity in the alveolar process, from which the incisor teeth have been removed. Fluid can be injected through this cavity into the floor of the nasal cavity.

The child also has gonorrheal vaginitis. The pus from the mouth has been examined by Dr. Adelaide W. Peckham, and a number of cells containing a diplococcus resembling the gonococ-

cus have been seen, but the cells were not sufficiently abundant to make a positive diagnosis. The staphylococcus aureus was also found. There have been many cases of gonorrheal stomatitis reported, but no case was found of necrosis of the jaw in which the gonococcus was probably the cause of the condition.

DR. D. J. MILTON MILLER said that the fact that the case of necrosis was really due to the gonococcus was remarkable. He did not think that the rhinitis looked syphilitic, but thought that the child should have the benefit of antiluetic treatment.

A CASE OF CRETINISM, AND A CASE SHOWING CRETINOID FEATURES,
WITH THE X-RAY REPORT.

DR. H. LOWENBURG and DR. G. P. PFAHLER (by invitation) showed these patients. The first was a girl of nine years with all the clinical features of cretinism. She was small in stature, with enlarged abdomen; dry rough skin, peculiar facies and thick protruding tongue. She was dull mentally, being unable to speak; the pulse was slow and the temperature subnormal. She is showing marked improvement under treatment with thyroid extract.

The second patient was a child of thirteen years with cretinoid features. Her family history was negative; her parents and brothers and sisters being people of normal appearance. Her size was that of a child of four years. The face was full and round and her expression resembled somewhat that of Mongolian idiocy. Still her mental condition was excellent, her standing in school being satisfactory. She can walk, talk, etc., in a normal manner. The physical growth alone seems impaired. The skin was dry. Prolonged treatment with thyroid extract has had no effect upon her condition.

EDEBOHL'S OPERATION FOR PARENCHYMATOUS NEPHRITIS.

DR. CHARLES H. WEBER showed a patient upon whom this operation had been performed. The child was two years of age. The parents, two sisters, and one brother of the child are living and well. According to his parents, he had never been ill; and there is no history of acute infection to account for this condition. He was taken sick about two weeks before his admission to the Children's Hospital, and had had anasarca one week. The heart and lungs were normal; but he was much swollen, especially

about the face and eyelids. His temperature ranged from 98° to 100° F., and he was passing an average of 38 to 40 ounces of urine a day. This urine was acid; had a specific gravity of 1,010; and contained albumin and hyaline and granular casts. The blood examination showed 4,760,000 reds; 17,900 leukocytes; and 55 per cent. of hemoglobin. He was treated with hot baths and diuretics, without any improvement in his condition.

Seven weeks after admission he was operated upon according to Edebohls' method by Dr. James P. Hutchinson, both the kidneys being decapsulated. Three weeks after this he began to show signs of improvement. The edema became very much less; and he has been improving ever since, with the exception of some puffiness of the eyes, which varies from day to day. The day he was exhibited his urine examination had shown a specific gravity of 1,030, acid, 7 per cent. albumin (Esbach), no sugar, and a few pale granular casts.

DR. GRAHAM described a case in which the improvement came on so soon after the operation that it must have been due to the massage and to the relief of tension in the kidney. Removal of the capsule relieves intracapsular tension and allows the kidney to swell. It permits of better circulation, so that the process of repair can begin and progress. In the three or four months that must elapse before the capsule is reformed, complete repair may have taken place; or it may have advanced to such a point that it can go on, in spite of the formation of the new capsule.

DR. HAMILL described a case of chronic parenchymatous nephritis that he had had operated on. The boy was ten years of age, and the attack was believed to have followed diphtheria. The patient had been treated in several institutions, with rest in bed, restricted diet, etc.; but the course was down hill. While in the Polyclinic Hospital he developed measles. At the height of the fever, on the first or second day of the eruption, the albumin completely disappeared from the urine. The only explanation of this that Dr. Hamill could give was that at the time when ordinarily he would have had marked hyperemia of the kidneys, and possibly a febrile albuminuria, the same thing had obtained that Edebohls claims is so valuable after operation.

At the operation both kidneys were decapsulated at the same time. One kidney had a short pedicle, and could not be removed from its site to be stripped; and there was a large vein at the

superior pole of the right kidney. The vein ruptured and the bleeding was furious. The left kidney could be delivered without difficulty. After the operation the anasarca rapidly disappeared. The urine and the urea were both increased in amount. The albumin and casts have not disappeared. The most remarkable effect of the operation is its influence upon the mentality. The boy had been four years in one class; but since then he has been advanced much as other children have. His teachers have noticed a most remarkable difference.

DR. WEBER, in closing, expressed regret that another patient operated upon the same day was not present. Of the two, she had shown the most improvement. He felt sure that she would not now be alive had she not been operated upon. There was a remarkable improvement in mentality in both children.

DR. GRAHAM said that in the 11 cases he had collected the mortality was 45 per cent.; but that these cases were desperate ones in which medical treatment had been tried systematically and had failed.

DR. ROBERT S. MCCOMBS presented a patient with

VINCENT'S ANGINA.

The case was exhibited because it showed the typical features of Vincent's angina. The child at first had a tonsilitis, which developed a membrane resembling diphtheria. It was foul, and yellowish-white; and when stripped left a raw, bleeding surface. A culture taken showed the Klebs-Löffler bacillus to be entirely absent, but the spirillum and the fusiform bacillus described by Vincent and others were present. The tonsils then showed a deep, punched-out ulcer, with congested edges.

Dr. McCombs also showed specimens from this case under the microscope.

DR. CARPENTER said that Vincent's angina occurs on the tonsils, on the alveolar margins of the gums, or on the inside of the cheek, and that when it affects the tonsils it closely resembles diphtheria. It has a sudden onset with high fever. When it affects the tonsils it appears more rapidly than when it affects other portions. Around the margins of the teeth it persists particularly long. The characteristic point is that after the false

membrane has come away, there is a deep punched-out ulcer with almost a gangrenous odor. The patients recover rapidly.

DR. BLACKWOOD mentioned a case reported by Bruce, in which the whole of the uvula and of one tonsil was destroyed, and the patient died of septic pneumonia. Dr. Blackwood then mentioned a case that he had reported to the Pathological Society, in which the disease lasted twenty-two days. There was high-fever, which finally dropped by lysis. Mayer has reported that endocarditis has followed this condition. The growth of the organism is helped by the addition of acetic acid. Dr. Rosenberger, director of the laboratory of the Philadelphia Hospital, has found these organisms in a case of noma in a child.

DR. ROYER said that it is sometimes puzzling to know whether cases of this sort are diphtheria or a pseudomembranous Vincent's angina. The disease is sometimes gangrenous and sometimes purely ulcerous. When it is limited to the teeth or the alveolar margins of the gums it is easy to diagnose, but when it is limited to the tonsils one cannot always diagnosticate it without waiting for a culture. If there are any organisms resembling diphtheria the case should be treated as a case of that disease.

Dr. Royer then described a case in a woman, coming on during labor. Some hours after delivery she had what was believed to be diphtheria, but on careful examination a strip of exudate was found under the tongue and inside of each cheek. The process was very extensive. Positive diphtheria cultures were obtained and the patient was placed in an isolated room. All her teeth were removed, and the places cauterized. She developed septic pneumonia, of which she died. It was impossible to tell by looking at the membrane whether it was true diphtheria or not.

Dr. Royer also said, in answer to a question by Dr. McCombs, that at the Municipal Hospital these cases are not isolated. On two occasions a second child has developed the disease in the ward; but it is not highly transmissible, and in his opinion it is not necessary to report such cases to the Board of Health.

DRS. D. J. MILTON MILLER and C. Y. WHITE exhibited specimens from a case of

CONGENITAL HYDRONEPHROSIS, DILATED URETHRA AND HYPERTROPHIED BLADDER IN A CHILD OF SIX WEEKS.

The complete report of this case will be found on page 375.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. CHAS. TOWNSEND DADE.
DR. HENRY HEIMAN.
DR. ALFRED F. HESS.
DR. J. HOWLAND.

DR. M. NICOLL, JR.
DR. G. R. PISKK.
DR. A. S. TAYLOR.
DR. SAMUEL W. THURBER.

PATHOLOGY.

Dieterle, Theopil: The Relation of Endemic Cretinism to other Forms of Maldevelopment. (*Jahrbuch für Kinderheilkunde*, September and October, pp. 465-521.)

The author attempts to separate endemic cretinism from chondrodystrophy and sporadic cretinism. Chondrodystrophy is micromelic in type and fetal in origin. In athyreosis (complete absence of the thyroid) ossification is delayed throughout the whole life, while in cretinism all centres become ossified at twenty-five years of age.

The author gives several reasons why endemic cretinism should not be attributed to the disturbed functions of the thyroid:—

(1) There is no cretin type of face as there is in myxedema.

(2) There is no proportionate relation between growth and intelligence.

(3) Cretins are not always apathetic.

(4) Deafmutism is common in cretins and not in cases of myxedema.

He classifies dwarfism and maldevelopment as follows:—

(1) Sporadic cretinism dependent on lack of thyroid secretion.

(a) Congenital myxedema due to lack of development of the thyroid. (b) Infantile myxedema due to acquired disturbance of thyroid function.

(2) Endemic cretinism, associated with goitre and deaf-mutism.

(3) Fetal skeletal diseases, not related to cretinism. (a) chondrodystrophy, micromelic dwarfism with alteration of the epiphyseal cartilages. Thyroid normal. (b) Osteogenesis imperfecta, micromelic dwarfism with a markedly disturbed growth of periosteum and endosteum, and no disturbance of growth at the epiphyses. Thyroid normal.

(4) Paltauf's dwarfism, with a skeletal growth in propor-

tion and persistence of epiphyses to an old age, with no other symptoms of myxedema. Intelligence normal. Thyroid present.

(5) Nanosomia, small skeleton with no pathological changes.

(6) Mongolism, with peculiar formation of the skull and marked imbecility. No delay in ossification. Thyroid normal.

The author thinks that cretinism is an inherited constitutional disease shown in dwarfism, idiocy, deafmutism, or a combination of these.

HENRY HEIMAN.

Oberndorfer: Cardiac Hypertrophy in Infancy. (*Centralblatt für Allgemeine Pathologie u. Pathologische Anatomie*, November 15, 1906, p. 887.)

At the annual meeting of the German Pathological Society Oberndorfer reported numerous cases of marked enlargement of the heart in infants. Although enlargement of the thymus may be considered to be the cause of some of the cases, others can in no way be accounted for. The weight of the heart (normally 24-40 grams during the first year of life) was three to four times that of the normal organ, 60, 66, 108, 1,329.

The children clinically gave no reason to suspect cardiac disease. Death in most cases was sudden, sometimes accompanied by convulsions. They were otherwise normally developed.

It is possible that alcoholism in the parents may account for the cardiac hypertrophy. We must also consider whether cases of so-called idiopathic enlargement of the heart, such as are diagnosed in later life, may not, in some cases, be referred to earliest childhood.

ALFRED F. HESS.

Calmette, A.; Guerin, C.; Delearde, A.: Tuberculosis of the Trachea-Bronchial Lymph Nodes of Intestinal Origin. (*L'Echo Médical du Nord*, May 13, 1906, p. 203.)

By feeding to young animals, susceptible to tuberculosis, small doses of bacilli of bovine origin, it has been shown that the latter passed through the intestinal walls, causing no apparent change in the mesenteric nodes by simple microscopic examination, and that later there followed swelling of the tracheo-bronchial and retro-pharyngeal nodes with or without pulmonary lesions.

Vallée has come to the same conclusion from experimentation with calves fed on the milk of tuberculous cows.

As a proof of the intestinal origin of bronchial node tuber-

culosis, the writers cite the following experiment: Two young calves, tuberculin tested, without reaction, were fed by gavage on material containing bovine tubercle bacilli. Forty-four days later they reacted violently to the test and were killed. The mesenteric nodes examined with great care showed no tuberculous lesions, but in the cortical zone on section, some white granulation. The peribronchial nodes of one animal were large, hard and of a fibrous appearance, with no caseation. A retrosternal node of the other was as large as a nut, hard and fibrous, but also without caseation. The lungs showed no tubercles.

Guinea-pigs, inoculated with portions of the mesenteric, peribronchial, retrosternal and pharyngeal nodes of these animals, all succumbed to tuberculosis.

Furthermore, the mesenteric nodes of twenty-four children dying in hospital were, in each case, inoculated under the skin of four guinea-pigs. In only four of these children did the autopsy show evidence of tuberculosis. In none of them, however, were there evidences of tuberculosis of the mesenteric glands, although these were swollen in all four. The guinea-pigs, inoculated with portions of the mesenteric gland of the four tuberculous cases, all became tuberculous in from thirty to forty-five days.

The nodes from three other children, in which there was no suspicion of tuberculosis at the autopsy, also produced the disease in the guinea-pigs. The seventeen remaining cases gave negative results.

From these experiments, the authors deem themselves justified in concluding: (1) That experimentally in animals, and clinically in children, whenever the tracheobronchial nodes are tuberculous, tubercle bacilli are present in the mesenteric nodes, even when the latter appear normal. (2) That pulmonary lesions in children as well as adults should be regarded as the result of intestinal infection. The inhalation theory not having been substantiated beyond dispute, it appears more and more evident that they both contract tuberculosis from the ingestion of infected milk, dust or food contaminated with bacilli or from particles of human sputum.

M. NICOLI, JR.

MEDICINE.

Holmes, E. M.: Middle Ear Suppuration as an Etiological Factor in Retropharyngeal Abscess. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 848.)

In reply to 250 cards of inquiry of ear, nose and throat surgeons, 147 reported as having never seen a case of retropharyngeal abscess due to middle ear suppuration. Ten reported as having seen one or more cases. Chevalier Jackson reports 12 cases at an average age of eighteen months. In 6 of them ear trouble had not been noticed until searched for; in 4 of these there was no aural discharge. Of the 12 cases 2 died, 1 of asphyxia. Several other observers report single cases in both children and adults, showing that this complication should be looked for.

SAMUEL W. THURBER.

Kelly, A. Brown: The Diffuse Hyperplastic Laryngitis and Pharyngitis of Congenital Syphilis. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 929.)

The various forms may be classified as follows:—

- (1) Hyperplasia associated with ulceration.
- (2) Hypertrophic granulations and papillary excrescences, with or without ulceration and often resembling lupus on the epiglottis.
- (3) Tumor-like hyperplasia.
- (4) Diffuse hyperplastic infiltration.

These conditions seen mostly after the third year.

SAMUEL W. THURBER.

Goodale, J. L.: A Contribution to the Differential Diagnosis of Certain Malignant Diseases of the Lymphoid Tissue of the Throat. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 949.)

The malignant affections localized in the pharynx and nasopharynx here cited are: pseudoleukemia, lymphosarcoma, malignant lymphoma and sarcoma. In 4 cases mentioned, the last was a boy of four years, who was seen for tonsil and adenoid obstruction. After removing these under ether, a large retropharyngeal mass was felt on the left. It was below the mucous membrane and suggested a glandular enlargement. In several weeks this mass caused so much obstruction that it was removed and

found to be a lymphosarcoma. Finally tracheotomy had to be done, and death occurred two months after he was first seen.

SAMUEL W. THURBER.

Love, Jas. Kerr: The Nasopharynx and the Throat in the Deaf Mute. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 1,009.)

In all countries there are from 20 to 30 per cent. of what the author calls semi-deaf and semi-mute—those that can hear loudly spoken words. The presence of enlarged tonsils and adenoids in these does not differ materially from that in children with normal hearing. If these children are to be taught to speak, it is vitally necessary that the resonating cavities above the larynx be made as normal as possible.

SAMUEL W. THURBER.

Hudson-Makuen, G.: Two Cases of Stammering Illustrating the Importance of Early Treatment. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 1,120.)

"The best time to treat this condition is before it begins." Both these cases, one of two and one-third years and the other of ten, showed a marked nervous disposition. The treatment instituted is done at home by the exclusion of all exciting amusements, a systematic course of calisthenics, especially breathing exercises; the proper method of forced expiration, such as is used, in crying, laughing, etc. Phonetic and syllabic speech should be practiced.

SAMUEL W. THURBER.

Ziem, C.: The Importance of Diseases of the Nose in Treatment of the So-called Scrofulous Diseases of the Eye. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 1,127.)

A regular cleansing of the nose by large amounts of non-irritating fluids is the first thing to be done in treating scrofulous conditions of the eyes. Children under five years can easily be thus treated, especially after a demonstration on some other child. In a number of cited cases the author claims to have obtained better results by this method than by any other. His contention that no fluid can enter the middle ear while the drum is intact is disputed by many.

SAMUEL W. THURBER.

Tschernow, W. E.: Dilated Colon in Children. (*Jahrbuch für Kinderheilkunde*, December 8, 1906, p. 811.)

The following pathological conditions are usually present in these cases:—

- (1) Dilatation of the cavity of the descending colon.
- (2) Elongation of the sigmoid flexure.
- (3) Hypertrophy of the wall of the colon and sigmoid flexure.

The author thinks that the condition is due either to a stricture (the result of aplasia or paresis of the gut) or to a relative narrowing of the intestines below the dilated portion. He claims that it is not a congenital but an acquired condition, as no authentic cases have been observed during the first few days of life. The treatment should be conservative at first, and should chiefly concern itself with overcoming the constipation which is nearly always present.

In cases where medical measures are of no avail, an anastomosis should be made between the lower part of the descending colon or the sigmoid flexure and the ampulla of the rectum.

HENRY HEIMAN.

Sequeira, James H.: Extensive Ringworm with Ulceration of the Umbilicus. (*The British Journal of Dermatology*, August, 1906.)

Extensive ringworm of the trunk and extremities is not uncommon in certain tropical and subtropical regions, but it is extremely rare in England, also in the United States, and the case the author describes possessed so many unusual features that a detailed record is made of them in his article. The boy was fourteen years old and had been affected since his sixth year, yet, notwithstanding the great involvement of the body, and the accompanying illustrations show how extensive this was, the scalp had never been involved—a remarkable feature—and there was but one small patch the size of a shilling on the chin, the face otherwise being also free. Microscopical examination showed the fungus in the scrapings from the nails, scales of the body and from the exudate of the umbilical ulcer which, no doubt, had been set up by the irritation of the fungus and was no doubt in the nature of a kerion.

CHARLES TOWNSHEND DADE.

SURGERY.

Sprague, Frank B.: Observations in One Thousand Adenoid Operations. (*Boston Medical and Surgical Journal*, October 11, 1906, p. 400.)

The author was unable to find any one etiological factor present in all cases. His patients were almost equally divided between males and females. The largest number of cases occurred at the age of eight. In 90 per cent. of his patients the adenoid growth was associated with hypertrophy of the faucial tonsils.

Among the most important subjective symptoms the author mentions the following: Repeated "colds," difficult breathing and mouth breathing, snoring, persistent cough, croup, hoarseness, tonsillitis, asthma, thick speech, nasal discharge, periodical ear-aches, deafness, chronic ear discharge, nervousness, restlessness, mental dullness, headache, epileptic seizures, frequent attacks of fever and digestive disturbance.

The most prominent objective symptoms were: Characteristic deformity of face, high arched palate, irregular teeth, imperfectly developed nose, deviation of the septum, turgescence of the turbinates, dullness of the drum-heads with the light spot absent, chronic suppurative otitis media, enlargement of the cervical lymph nodes and deformity of the chest.

The diagnosis was made in most cases by the above enumerated symptoms. Mouth breathing was absent in 50 per cent. of the cases. The author considers the ear symptoms of great diagnostic importance. He condemns the digital exploration of the pharynx, which he considers barbarous, useless and often misleading. In many of his patients there was present a small area of swollen mucous membrane on the floor of the nose on a line with the anterior of the inferior turbinate. In most cases of hypertrophy of the tonsils, adenoids were present.

The author prefers deep ether anesthesia for the operation. Chloroform is dangerous on account of the status lymphaticus often present in these cases.

In the removal of the adenoids the use of forceps gave him the best results. He advises a thorough operation, and lays great stress on the importance of cleaning out the fossa of Rosenmüller.

The author had no cases of primary hemorrhage, and only one of a non-fatal secondary hemorrhage. He had only 2 cases

of recurrence. The improvement in the symptoms after the operation were marked in most of the cases.

HENRY HEIMAN.

Theisen, Clement F.: Tumors of the Trachea. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 645.)

The majority of the cases of tracheal papilloma occur in children. Six of the recorded cases are congenital, because the children were hoarse and there was dyspnea from birth. The same is true of laryngeal papillomata, about $\frac{1}{4}$ being congenital. These growths are found mostly in the upper part of the trachea, and can cause sudden death by suffocation.

SAMUEL W. THURBER.

Coolidge, A., Jr.: Foreign Bodies in the Trachea and Tracheoscopy. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 684.)

After giving the details of the proper treatment of foreign bodies in general, and the use of the newer instruments for direct inspection of the upper air passages, the author cites 3 cases in children where foreign bodies were successfully recovered. In the first patient, a boy of eight years, a prune stone was taken from the right primary bronchus. In the second, a boy of nine years, a shingle nail, which had been seen by the aid of the X-ray at the bifurcation of the trachea, was removed at the first attempt from the mouth of the left bronchus. In the third case, a girl of two years and three months, who had swallowed a dress hook four days previously. This was seen by X-ray at the fifth rib to the right of the spinal column. On account of the small size of the larynx, after trying this route, a tracheotomy was done and the hook removed from the right bronchus. It is the general experience that it is safer to take the lower route through a tracheotomy opening in the very young patients. In children, this means of inspecting and clearing the upper air passages can rarely be undertaken without the aid of a general anesthetic.

SAMUEL W. THURBER.

Moure, E. J.: Intercrico-thyroid Tracheotomy and Decannulation. (*Annals of Otology, Rhinology and Laryngology*, December, 1906, p. 1,153.)

This article follows an address before the Paris Academy of Medicine in 1900, and corroborates the opinion expressed at that

time, that it is highly important to decannulate infants and children upon whom an intercrico-thyroid tracheotomy has been done at the earliest possible moment, in order to avoid the glottic and subglottic stenosis that would follow the prolonged stay of a cannula. There is danger of ankylosis in the cricoid articulations and loss of function and speech. Avoid cutting the cricoid in infants.

SAMUEL W. THURBER.

Cartledge, A. M., and Bullitt, J. B.: Report of a Case of Intussusception Subjected to Operation. (*Annals of Surgery*, November, 1906, p. 674.)

The case, an eight-year-old boy, suffered from abdominal cramps just after an attack of scarlet fever. Five days after the onset of the cramps he was removed to the hospital. A tumor could be felt in the left side which, with the onset of pain, would harden like a parturient uterus.

Because the general condition was very poor and the abdominal condition not urgent, the boy was watched for nine days, when he was so much improved that he left the hospital.

At the end of thirteen days (twenty-seven from the onset of abdominal symptoms) severe pain, vomiting and prostration caused his return to the hospital.

Incision through left linea semilunaris was followed by longitudinal incision of the descending colon, resection of six inches of intussusception (not all of it), with closure of the gut, and the formation of an artificial anus above the intussusception. Reaction was favorable.

After several weeks (not clear in paper) the fistula was closed and the boy made a good recovery.

The apex of the intussusception was ileocecal valve. A portion of intussusception was not resected.

A. S. TAYLOR.

HYGIENE AND THERAPEUTICS.

Saltykow, A. N.: The Serum Treatment of Scarlatina According to Reports in the Literature. (*Archiv. für Kinderheilkunde*, xliv. Band, iv. bis vi. Heft, p. 339.)

In this article an account is given of the various sera that have been used against scarlatina: Marmorek's,¹ Aronson's,

Moser's, Savschenko's, Palmirski's and Marpmann's, and the results that have been obtained thereby. All of these sera have been prepared by immunizing animals against streptococci with the belief that though the real cause of scarlet fever, still unknown, is unaffected by this means, the streptococci, which as secondary invaders produce the worst effects, will be antagonized. The literature is complete.

The opinion is expressed that Moser's and Marpmann's sera are entitled to more experimental use than are the others.

J. HOWLAND.

Philips, Fermin: Ferment Therapy of Infants. (*Monatsschrift für Kinderheilkunde*, November, 1906, p. 413.)

As a result of clinical and chemical experiments on four somewhat marantic infants, the author comes to the following conclusions:—

(1) The addition of ferments to the food has no influence on the absorption of nitrogen, carbohydrates or fats; nor on the retention of nitrogen in the body. They do not produce a gain of weight.

(2) The ferments are not absorbed in the stomach or intestines, but are destroyed there.

(3) The splitting up of amygdalin in the intestines is probably due to the presence of invertin.

HENRY HEIMAN.

Amberg, Samuel: The Opsonic Content of the Blood of Infants. (*The Journal of the American Medical Association*, January, 1907, p. 304.)

Amberg's tests were based on the staphylococcus citreus as applied to breast- and artificially-fed infants. His conclusions are not in accord with the findings of Moro, that the blood of the breast-fed infant has greater bactericidal power than that of other infants.

He finds that the average values for the opsonic content of infant's blood is greater than the values given by Simon for normal adults.

The advantage in favor of the breast-fed infant seems to be dependent on the state of nutrition, and perhaps on the constitution.

G. R. PISEK.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

JUNE, 1907.

[No. 6.

Original Communications.

SOME POSSIBLE ETIOLOGICAL FACTORS IN THE RECURRENT VOMITING OF CHILDREN.* †

BY JOHN HOWLAND, M.D.,

AND

A. N. RICHARDS, PH.D.,
New York.

The etiological factors concerned in the recurrent vomiting of children have always been hidden in obscurity. As long ago as 1861, Lombard accurately described the clinical picture of the condition and outlined the treatment much as we follow it to-day. But to him as well as to all who have followed since, the causative agent has been a stumbling-block.

Many different views have been held by the writers who have so clearly described the symptomatology of recurrent vomiting and from the number of accumulated histories all have agreed upon certain points. They have agreed that an underlying neurotic constitution, inherited or acquired, is practically the rule, and that the exciting cause is often found in fright or excitement, great fatigue, anger, sudden exposure to cold and rarely to blows upon the abdomen, all of these believed to act upon or through the nervous system. The negative side is especially worthy of emphasis. They have agreed that the attacks are not directly attributable to errors in diet.

A decided advance was made when Edsall, Pierson and Marfan showed that in the attacks acetone, diacetic acid and β -oxybutyric acid are excreted in the urine in large amount.

Acquainted with these facts, two years and a half ago Dr. Richards and I began to study this question of the etiology of these attacks, making use of material which Dr. Holt most generously placed at our disposal. Three children suffering

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, June 1, 1906.

† The analyses and experiments mentioned in this paper were conducted in the Laboratories of Pharmacology and Physiological Chemistry of Columbia University, at the College of Physicians and Surgeons, New York.

from these attacks I have had constantly under observation since then and have been exceedingly fortunate in having seen at least a dozen others. From a study of the urine of these cases we hoped to obtain an idea of the metabolic changes which accompany the attacks, in the belief that if this were possible we might be able, by suitable means, to reproduce the symptoms in experiments on animals.

In the first place, we have confirmed the often-repeated observation of the presence of acetone and diacetic acid. In some cases we have found β -oxybutyric acid to be present. The summary of our examination in this regard it is not necessary to give, since it is a mere confirmation of the work of others. It is sufficient to say that in the vast majority of cases of this type these substances are excreted in fairly large amounts in the urine. They are usually present before the attack of vomiting comes on, but in one case they were not found till after the vomiting had begun.

We have confirmed the observations of others in another respect, namely, that during and especially at the outset of an attack there is an increased excretion of uric acid. Some of these data are presented in the table F and more detailed reference to them will be made later. We find invariably a heavy sediment of amorphous urates, which fails to occur when the vomiting ceases.

We present in tables J. S. and McA. data relating to the excretion of sulphur. It is seen in both that the excretion of sulphuric acid diminishes while that of the neutral sulphur, *i.e.*, unoxidized sulphur, increases.

TABLE F.—MILD ATTACK. VOMITING FOR FOURTEEN HOURS.

Day.	Total N. Grams.	NH ₃ .	Uric Acid, Grams.	Indican.	S as SO ₃ .	Neutral. S.
2	10.064	1.54	0.61	++		
3	6.213	0.78	0.41	++++		
4	5.477	0.55	0.26	-++		
5	5.572	0.35	0.14	++		
6	4.892	0.20	0.19	++		
7	5.733	0.45	0.20	+		
8	6.160	0.33	0.21	++		
9	5.754	0.37	0.19	-++		
x*	10.416	0.29	0.10	++	0.52	0
y	7.168	0.20	0.09	++	0.50	0.06

* x and y are two normal days about 2 weeks later.

TABLE J. S.

	Total N. Grams.	Total SO ₃ Grams.	Neutral Sulphur. Grams.	Indican.	Lactic Acid.
First day of attack	6.90	0.45	0.09	Strong reaction.	Present.
Normal day after attack	9.90	0.50	0.05	Strong reaction.	Not present.

TABLE McA.

Day.	Total S. Grams.	Sulphur as SO ₃ . Grams.	Neutral Sulphur. Grams.	Total N. Grams.
1	0.30	0.20	0.10	4.68
2	0.42	0.27	0.15	5.21
3	0.44	0.35	0.09	5.04
4	0.40	0.28	0.12	5.94
5	0.44	0.35	0.09	6.34
6	0.36	0.29	0.07	4.94
7	0.49	0.36	0.14	6.03
8	0.42	0.35	0.07	6.05
9	0.47	0.41	0.06	6.28
10	0.65	0.57	0.07	9.34

In J. S., also, the only specimen we have tested in this regard, lactic acid was observed to occur at the onset of the attack, and was not found after recovery had ensued.

Our results on indican excretion agree with those of other observers in showing that the quantity of indican is increased in a high degree before and in the first days of the attack. It may continue to be excreted in large amounts throughout the attack and may be detected in abnormal amounts even after recovery.

A brief consideration of the possible significance of these urinary changes will indicate the ground on which our experimental work was based.

It is now the general belief that fats yield energy to the body as the result of a series of oxidative transformations, the final products being CO₂ and H₂O. Under perfectly normal conditions this transformation is a complete one, *i.e.*, only CO₂ and H₂O are excreted and none of the intermediate products appear in the excreta. Among these intermediate products of the combustion of fats are β -oxybutyric and diacetic acids.

The recent researches of Weintraud, Rosenfeld, Hirschfeld

and others have shown, however, that the combustion of fats is not complete unless at the same time there is an adequate oxidation of carbohydrate. The processes by which fat is burned are so dependent on the simultaneous combustion of carbohydrate that, if for any reason carbohydrate fails to be burned in sufficient degree, the intermediate products of fat metabolism appear in the urine, *i.e.*, diacetic, β -oxybutyric acids and acetone. Carbohydrate may fail to be burned in sufficient amounts for either or both of two causes. It may not be present in sufficient quantity in the diet, or the body cells may have lost in a greater or less degree their power of oxidation of carbohydrate. For the former reason, the acetone bodies are excreted in starvation; for the latter reason, they make their appearance in diabetes.

If we should assume that this diminution in carbohydrate combustion is the *sole* cause for the elimination of acetone bodies in these cases of recurrent vomiting, then we must decide on what factor the limited carbohydrate combustion depends.

One consideration leads us to believe that it does not arise as a result of carbohydrate starvation—namely, that the interval of time in many cases which exists between an apparently normal condition of the child and the onset of vomiting with the appearance of these substances in the urine is no longer than elapses between two consecutive times of feeding. In such cases it is obvious that the factor of starvation cannot be the essential factor. It seems more logical to assume that it is mainly due to a diminished power of oxidation of the body cells.

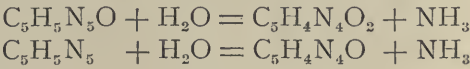
In any case, in these attacks the acetone bodies are probably excreted as the result of lessened oxidation of fat, brought about either indirectly as the result of lessened sugar combustion, or by a direct influence of some unknown nature on fat combustion.

Uric acid is one representative in the urine of the metabolism of nuclear compounds. Its excretion may be markedly increased by the addition of nuclear substance or of nuclein derivatives to the diet. In these cases, however, its increase cannot be due to such a cause as this, for the composition of the diet is either unchanged or is very much diminished. It must arise, therefore, as a product of the decomposition of nucleoproteids of the body, *i.e.*, it is largely *endogenous* uric acid.

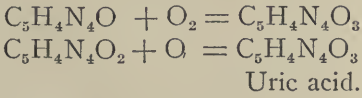
The nucleoproteids are decomposed in metabolism with the formation of—

Adenin	$C_5H_5N_5$
Guanin	$C_5H_5N_5O$
Hypoxanthin	$C_5H_4N_4O$
Xanthin	$C_5H_4N_4O_2$

The enzymes guanase and adenase transform guanin and adenin into xanthin and hypoxanthin respectively:—



Hypoxanthin and xanthin are then transformed into uric acid by oxidation brought about by the influence of an enzyme, oxidase;



Not all, however, of the uric acid thus formed is eliminated as such. Under the influence of a “uricolytic” ferment, recently discovered, uric acid is further broken down by oxidation, so that in man only about one-half of the uric acid *formed* is eliminated in the urine as such.

To return to these cases, then, we cannot explain the increased elimination of this substance by change in the composition of the diet. It could, therefore, be due to an increased formation or to a decreased oxidation of uric acid. That it is due to decreased oxidation is suggested by the figures for total nitrogen.

In the table in which the uric acid estimations of F are given, it is seen that while the nitrogen values of days three and four, or four and five, are nearly constant, there is a very marked decrease in uric acid. If this decrease in uric acid, which, as the other figures show, is a decrease toward the normal and doubtless has the same significance in a reversed sense as the initial increase in uric acid, were due to a lessened metabolic decomposition of nuclear compounds a decided change in the nitrogen elimination would probably accompany it. That is, at the same time that the purin bases are split off from the nucleoproteids, metabolism of the nitrogenous portion of the nucleoproteids takes place and increased elimination of nitrogen would result. Since the proportion of purin bodies which can be obtained from any single nucleoproteid is small (1 per cent.) and since the amount of

nitrogen is large (16 per cent.) it is obvious that an increase in uric acid (which represents increase in nuclein metabolism) must be accompanied by a far greater increase in total nitrogen. These considerations have led us to the conclusion that the origin of the increase in uric acid in these cases, not being due to change in diet, or to increased nuclein metabolism, must be due to decreased destruction. Since the destruction of uric acid takes place as a process of oxidation, we may conclude that oxidation of uric acid at the outset and in the first periods of the seizures we are studying, is interfered with.

Additional evidence of interference with oxidation is shown by the elimination of sulphur of the urine. Normally, about 90 per cent. of the total sulphur is excreted in the form of sulphuric acid, *i.e.*, oxidized sulphur. Most of the SO_3 arises from the oxidation of the sulphur-containing radicals in the proteid of the diet. Most of the unoxidized sulphur arises from the metabolism of the sulphur-containing proteids of the body cells. A decrease in the diet would therefore, by lessening the SO_3 in a greater degree than the neutral sulphur, increase the ratio. For this reason it is found that the ratio of neutral sulphur to sulphuric acid sulphur in starvation increases. But it is equally obvious that in such a condition the total sulphur will diminish. In our cases, especially J. S., this is not found to be the case. The total sulphur of the two days analyzed remains the same, while the neutral sulphur rises and the oxidized sulphur falls. We believe this change to be due not to starvation, but to an interference with the processes by which sulphur is oxidized to SO_3 .

Still further and more convincing than all is the observation of the occurrence of lactic acid. Lusk has shown very recently that in the combustion of dextrose, lactic acid is formed as an intermediate product. It had previously been shown that lactic acid introduced into the body is completely oxidized, *i.e.*, none of it reappears in the urine. In conditions of incomplete oxidation, however, lactic acid appears in the urine spontaneously and if injected is excreted as such. It is therefore a decidedly abnormal constituent of the urine and as much as any other constituent may be looked upon as an indication of decreased oxidation.

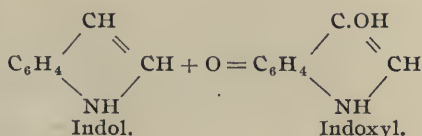
To sum up these conclusions, we believe that the figures we have quoted and the considerations which we have offered justify the belief that at the outset of the attacks there is an interference

with certain metabolic processes in which oxidation plays a part; that as the attack wears off the urinary signs of this interference wear off.

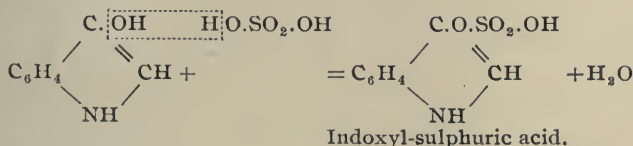
It has been stated that in the urines of these cases we have confirmed the observation that abnormally large amounts of indican are excreted before the attack. This indicates, of course, an increase of putrefactive processes in the intestine, with an increase not only of indol, but also of skatol, phenols, etc. We have given our reasons for the belief that at the same time there is a lessened power of oxidation in the body.

The question at once arose of the possibility of a relationship between these two factors.

Urinary indican results as a synthetic product of the oxidation of indol:



Indoxyl is converted into indican by combination with sulphuric acid.



The same changes take place in the excretion of skatol, which is simply methyl indol.

Indol and skatol then require oxidation before transformation into the final form in which we find them in the urine.

Phenol, however, combines directly with sulphuric acid, forming phenol-sulphuric acid. It has been argued by some competent observers that this power of the cells of effecting the combination is dependent upon simultaneous oxidation; that influences which diminish the power of oxidation lessen power of phenol synthesis.

Comparatively few data regarding the toxicity of indol and skatol exist. Large amounts (18 grams) have been administered to healthy animals with the production of no symptoms. The matter is summed up in Kunkel's Toxicologie with the statement

that from the experimental evidence at our disposal we must conclude that indol is non-toxic. This indicates in a striking manner the adequacy of the organism for transforming substances of this type.

If, however, the ability of the organism to effect this oxidative transformation is diminished it is possible that any toxicity which these substances possess will be exhibited. Our animal experiments are designed to throw some light on this question.

As means of diminishing oxidations we have made use of potassium cyanide and of chloroform. Potassium cyanide has been shown very definitely to diminish the ability of cells to utilize oxygen even though oxygen may be present in normal amounts in the blood. Chloroform possesses the same property in a lesser degree.

In the first series of experiments on rats, guinea pigs and rabbits, the effects of definite doses of phenol and indol in normal animals were compared with those produced by the same doses in animals previously injected with small amounts of KCN or previously subjected to chloroform anesthesia. The results are shown in the following table.

ANIMAL EXPERIMENTS.

No.	Animal	Poisons Used	Convulsions Produced		
			Onset in	Duration	Intensity
1	Guinea pigs....	KCN + Phenol Phenol alone	4 minutes 4 minutes	75 minutes 25 minutes	Great Slight
2	Rats	KCN + Indol Indol alone	1 hour 13 minutes 1 hour 8 minutes	11 hours 3½ hours	Great. Death after 11 hrs. Slight
3	Guinea pigs....	KCN + Indol Indol alone	2 minutes 8 minutes	5 hours 1½ hours	Great Slight
4	Rats.....	CHCl ₃ + Indol Indol alone	13 minutes 6 minutes	8 hours 3 hours	Marked Marked
5	Guinea pigs....	CHCl ₃ + Phenol Phenol alone	5 minutes 7 minutes	50 minutes 8 minutes	Marked Very slight
6	Rabbits.....	KCN + Phenol Phenol alone	After intravenous infusion of 1 c.c. of 4 c.c.	2 hours 45 minutes	Marked Less marked

From these we conclude that diminution of oxidation intensifies and prolongs the poisonous effect of a moderate amount of either phenol or indol.

Our experiments on dogs afford a better idea of the nature

of the effect which indol is capable of producing when its oxidation is interfered with. We have not yet extended our studies in dogs to phenols and skatol.

In the first place, we convinced ourselves that the quantities of indol (0.25-0.5 gram) which we used in combination with the other poisons (KCN and CHCl_3), given alone, produced no symptoms. If, however, a dog is poisoned by repeated small doses of potassium cyanide which are sufficient to produce distinct but not fatal symptoms of cyanide poisoning, both before and after the introduction of the indol, very marked symptoms result, which cannot be attributed to the action of the cyanide alone.

In the first experiment it was difficult to attribute any of the symptoms to the effect of the indol in the hours directly succeeding the injection. There was muscular twitching and evidence of increased peristalsis of the intestine, which may have been due to this substance. But, after ten to eighteen hours, effects were evident which were not due to the cyanide alone—and which we attribute to the action of indol—a condition of stupor and semi-consciousness came on which was interrupted by periods of wild delirium, marked by frantic, uncoördinated movements and shrill screaming. The delirium came on at times spontaneously, and always followed the stimulation of rough handling or rectal irritation produced by the insertion of a thermometer. This condition lasted till the death of the animal a week after the indol was given. During this period there was marked exaggeration of the reflexes, spasticity of the hind limbs, total blindness. During the whole period, food or water was not voluntarily taken; water given by a stomach tube was sometimes retained, though there were signs of nausea. Milk, diluted milk, or beaten egg, given in the same way, was immediately vomited. Throughout the whole period there were noticed in a marked degree the typical gurgling sounds of increased intestinal peristalsis, but no feces were passed.

Two other animals treated in the same way with a proportionally larger dose of indol developed identical symptoms and died on the third day.

In two dogs, a single injection of cyanide, accompanied with a smaller dose of indol, was given. One dog was killed after thirteen days, during which time the prominent symptoms were blindness, mental depression, with some delirium, increased re-

flex excitability, enormous appetite associated with increasing emaciation, constant nausea and bloody feces.

The second dog died after a period of five weeks, in which the blindness and nausea were the most prominent symptoms. During the three days preceding death, however, he developed the mental signs described above.

If, instead of potassium cyanide, prolonged anesthesia with chloroform or artificially induced asphyxia be used as means of reducing oxidation, strictly comparable results may be obtained. It should be mentioned that in the case of chloroform the gastrointestinal symptoms seemed to be more marked than with potassium cyanide. Not only did the feces contain blood, but bloody material was vomited.

An interesting fact has been noted with regard to the excretion of indican. The doses of indol which we have used will be entirely excreted by a normal animal in the form of indican in twenty-four hours. If at the same time its oxidation is diminished, the amount in the urine becomes less and its excretion is prolonged over a longer period of time (forty-eight hours or more). This emphasizes the important clinical fact that the amount of indican in the urine depends not only upon the amount of indol formed and absorbed, but also upon the capacity of the body cells to oxidize it.

At the autopsies of the animals which have been poisoned as we have described, the results are very uniform: Marked congestion of the gastrointestinal tract, especially of the duodenum, lower part of the ileum and colon with extensive necrosis of the mucosa and even of the submucosa. There is blood in the intestinal contents. The liver showed very great degenerative change, there was excessive cerebrospinal fluid and the tissue of the brain was soft. The more acute the poisoning the more marked were the changes in the gastrointestinal tract.

That the effects which we have described are due to the indol and that they are not due to the direct effect of the poisons which we have combined with it we are convinced. In the first place, control experiments on potassium cyanide alone agree with the very extensive experience of Geppert and others, that when recovery from cyanide poisoning occurs at all it is rapid and complete, the only after effects being weakness from exhaustion. In the second place, we are able to produce the same symptoms with

the second drug, chloroform, which bears no resemblance to potassium cyanide, save in its power to affect oxidations. Thirdly, we are able to produce the symptoms by mechanically reducing oxidation, *i.e.*, by asphyxia.

It is apparent, then, that the symptoms of this form of indol poisoning may be divided into two groups, nervous and gastrointestinal. We made one experiment designed to afford an explanation of the gastrointestinal disturbance.

In one dog a section of the small intestine, 8 to 10 inches long, was severed from the main gut, its ends sewed to the abdominal wall, and an end to end anastomosis of the main gut established. A month later, when recovery was complete, the dog was poisoned with KCN and indol in the manner previously described. The urine gave no reaction for indol, but it could be detected in washings of this isolated loop of intestines. Furthermore, the odor of indol could be detected at the abdominal opening of the fistula.

This experiment indicates that if indol is circulating free in the blood, owing either to abnormally great formation or to abnormally decreased oxidation, it is excreted by the intestine rather than by the kidney.

We have proof that when the power of oxidation is diminished, indol, ordinarily non-toxic, is a most powerful poison. It is a matter of observation that children subject to attacks of recurrent vomiting exhibit evidences of increased intestinal putrefaction by an increase in the urinary indican whose precursor is indol, and often by foul stools. During the attack, constipation is the rule, which would still more increase the absorption of indol. The presence of indol in comparatively large amounts can, therefore, be assumed, and we have shown that during these attacks diminished oxidation is present.

We have evidence that the toxicity of phenol is increased, but have not sufficiently studied this nor skatol and the cresols. Since the transformations that these undergo in the organism are the same as indol and phenol, there is every reason to believe that the results will be similar. Let it be understood, however, that we do not claim that these aromatic substances are alone the cause of these attacks. It is possible that other substances, absorbed from the intestinal canal or formed in intermediary metabolism, may be also responsible.

We have not produced in animals symptoms identical to those in children and probably shall not be able to do so. The diminished oxidation in children is moderate but prolonged. Our imperfect methods allow us to produce an intense, but evanescent, diminution of oxidation in animals. As soon as this wears off, the poisons are rapidly eliminated by the kidneys; before it wears off, it is probable from the experiments previously mentioned, that the gastrointestinal tract attempts to get rid of them. This would seem to account for the gastric symptoms. It is only while under the influence of the poisons that there is diminished oxidation and the poisoning is so profound that the animals are practically anesthetized. While this was wearing off they did show gastrointestinal symptoms, vomiting, sometimes bloody, nausea and bloody stools. In children, with the moderate but prolonged diminution of oxidation, gastric symptoms can readily occur, and we have reason to believe that these substances are eliminated by the stomach, from the examination of the vomitus of F. Two samples of vomitus, clear and not bile-stained, contained a trace of indol.

These aromatic substances, as the experiments show, in large enough amounts are convulsants, and it is suggestive to read that one of Snow's patients up to the age of five years always had a convulsion before each attack and that Langmead's fatal case terminated in convulsions.

To compare the autopsy findings is unsatisfactory for the reason that few postmortem examinations on children dying from recurrent vomiting have been recorded, and those in a most meagre way. Griffith found necrotic changes in the stomach and intestines. Marcy's case was carefully examined. The stomach showed extravasated blood under the mucosa with apparent softening; this was also marked throughout the intestines. Microscopically he found almost complete necrosis of the entire mucous membrane of both the stomach and intestines. Most of the epithelial cells did not stain at all, they being represented by an indistinct granular mass; the necrosis appeared to have invaded the submucous coat. There was fatty infiltration of the liver and slight parenchymatous degeneration of the pancreas, spleen and kidney.

As mentioned above, our dogs showed very great congestion of the gastrointestinal tract with extravasations of blood. In

places the mucous membrane was very necrotic and there was enormous degeneration of the liver.

It appears to us in the light of our present knowledge that a shock, excitement, fright, anger or something of the kind, is exerted upon an unstable nervous system, unstable by inheritance or development, and also by age; for we cannot doubt that similar shocks are felt at a later time, but in the course of growth the brain and nervous system acquire a more stable equilibrium. As a result of this, in some way or other, unknown to us, a diminished power of oxidation results and the organism loses the power to detoxify substances absorbed from the intestine which have been present there in excess; these circulate in the blood, exerting their poisonous action and cannot be excreted by the kidneys because they are not brought to them in the proper form. It seems probable that they are excreted and reabsorbed by the stomach and intestine, in the light of which vomiting would appear to be eliminative and thus a protective mechanism.

Finally, the power to oxidize and detoxify these substances returns; they are rapidly eliminated, and quick improvement results.

DISCUSSION.

DR. GRIFFITH.—The paper is upon a subject in which I have felt great interest. It touches a part with which I was myself entirely unable to deal, viz., experimental work upon the pathological physiology. The impression which I got from hearing the paper read is that nearly every writer up to the time of Edsall had regarded this as a pure neurosis. I do not think that this represents quite correctly the state of affairs. Certainly, my own expression in an article published on the subject some years ago was strongly that the disease was a toxic neurosis—not a pure neurosis at all in the ordinary sense. I was not able to discover any influence exerted by fright, shock or nerve strain, and some of the cases were studied with great care as to this very point. In some instances, however, there does seem to be such an influence, and in a case observed subsequently the attacks were apparently traceable to over-exertion.

The relation of acetone to this disease has been spoken of repeatedly in medical literature. In the 2 fatal cases I reported the urine was examined by a colleague, who at once expressed the view that the child was suffering from acetone poisoning. I maintained that acetone did not produce the symptoms from which the child died, and that it was the result and not the cause

of the condition. It is unfortunate that this has been described as acetoneic vomiting by French writers, as this gives an impression which is far from representing their opinion. Marfan distinctly states that the acetone is not in his opinion the cause. Dr. Edsall's paper was the first to throw light upon the subject as regards the condition being possibly an acidosis. Although good results were obtained in some instances by the administration of bicarbonate of soda to counteract this acidity of the blood, there have been cases since then that have not been benefited by this plan at all, and we are again somewhat at sea as to the cause.

I would ask the writer of the paper not to make a distinction between Marcy's two fatal cases and mine; they were the same cases, seen by me in consultation with him.

DR. EDSALL.—I have been very much interested in this work and in the important results that Dr. Howland and Dr. Richards have obtained.

I think that Dr. Griffith is quite right in the statement that he has just made, that a considerable number of cases of recurrent vomiting respond, at best, only partially to treatment with large doses of alkalis. I am not surprised at this, for I said, when I first discussed the possible relation of acid intoxication to these cases, that acid intoxication is always a secondary condition dependent upon some preceding cause, and that controlling it is merely controlling a symptom. It is, however, sometimes the most important symptom, and controlling it in such a case is the essential part of the treatment. I have seen at least 3 cases in which the treatment with large doses of alkali seemed to exercise such absolute control over the attacks that they have for several years entirely ceased.

I have been casting about, for the last year or so, for some possible explanation of the occurrence of the acid intoxication; and, as I told Dr. Richards, in conversation with him, I had rather expected that he and Dr. Howland had perhaps been studying the condition along the lines that have recently been used in studying the acid intoxication following chloroform-anesthesia. The recent valuable work of Alonzo Taylor, for example, has shown that in a case of acid intoxication following chloroform-anesthesia autolytic processes were abnormally increased, and apparently the acid intoxication was secondary to this. This seems to me to offer possible explanation of the occasional good effects, as well as of the failures, that are seen when alkalis are used in these cases.

The work of Rowland and Hedin has indicated that autolytic processes are favorably influenced by acids and unfavorably affected by alkalis. It has, therefore, seemed to me possible that the effect of alkalis in these cases might be twofold; that is, that they would decrease any acid intoxication present, and would thereby control the symptoms due directly to the acid intoxication,

and, at the same time, by decreasing the amount of acid present, they would tend to control any excessive autolytic changes going on. In some instances, the acid intoxication might be the most important abnormality present from the symptomatic standpoint; and, in such cases, alkalies would control the symptoms. In mild cases of increased autolytic activity, this condition would likewise be controlled; but in cases in which the disturbance of autolysis had already produced severe lesions, it would be impossible, of course, by merely controlling the acid intoxication, or even by halting the increased autolysis, even if this is feasible, to control the symptoms due to the tissue destruction that has already been accomplished. This possible explanation would, I think, give an indication of the reason why alkalies appear in some cases to abort the attacks successfully, and to be, when useful at all, most useful in the early stages of the attacks. These suggestions are merely suggestions, as they have not yet been worked out; but it is possible that they may help us to understand the condition.

The results that Dr. Howland and Dr. Richards have obtained demonstrate clearly, as they say, that there is a profound disturbance of the organism at the time of the attacks; but I cannot help feeling that they can be brought quite as directly into the line of reasoning that I have suggested, as they can be explained on the basis of changes in oxidative processes alone. For example, an increase of neutral sulphur and uric acid in the urine is, of course, observed in cases in which oxidation is supposed to be disturbed. As a matter of fact, however, we say, to my mind, more about disturbed oxidation than we actually know, and it is an exceedingly complex matter to determine positively that any particular individual has decreased oxidation. On the other hand, an increase of the neutral sulphur and uric acid of the urine is known to occur in conditions in which there is an increase of tissue-destructive processes; and it may quite as well, therefore, be an indication of increased autolysis as of decreased oxidation.

Furthermore, while the experimental results in animals are highly interesting as demonstrating the possibility of severe toxic effects from indol when given in combination with other substances, I am not yet convinced that the results that have been described have any definite relation to changes in oxidation. While hydrocyanic acid does have an influence upon oxidative processes, its influence is by no means limited to this alone; it is, for example, known to have, in addition to this, a profound effect upon many ferment processes. A point of importance in this connection is the fact that the normal antidoting of indol in the body is not merely a question of oxidation to indoxyl, but is also a question of its combining with sulphuric acid to form indoxyl sulphate. The synthesis is probably quite as important as

the oxidation; and, indeed, it is not improbably more important in this as well as in other antidotal processes in the body. For example, in the detoxication of phenol in the body, a similar synthesis with sulphuric acid occurs, but without the oxidation; and again, in the detoxication of benzoic acid, the process consists simply in synthesis with glycocoll to form hippuric acid.

The relation of these facts to the experimental observations that have been reported in this connection with hydrocyanic acid is that it has been clearly shown that hydrocyanic acid interferes with the synthetic action as well as the contrary action of some ferments, both organic and inorganic; and this is clear evidence that its important effects are not limited to those exercised upon oxidative processes. It is, too, not at all clear that the experimental results reported have actually any relation to recurrent vomiting.

These apparent criticisms, however, are merely academic criticisms of the explanation that has been offered of the results obtained. The practical point in view is that these investigations have shown very remarkable and important changes in the urine, which indicate profound general disturbance of the organism of the child at the time of the attacks; and the experimental results with the cyanides and chloroform are extremely interesting.

DR. FREEMAN.—I have had recently a very pretty illustration of the relation of shock to these attacks. A child five years old had attacks at intervals of six weeks to three months, and was kept free from attacks for a year by watching and making examinations of the urine and by using on the slightest suggestion of an attack calomel and alkalies and rest. Early this spring he had a fall from a bicycle, striking the back of the head, this shock being immediately followed by a typical attack lasting three or four days and accompanied by marked acidity of the urine with diacetic acid and acetone.

DR. RICHARDS.—In regard to Dr. Edsall's remarks as to the influence of chloroform on the autolytic processes and the influence of the drugs we used, it has been shown by Herter and Wakeman that autolysis after chloroform poisoning is increased, as it is under the influence of phosphorous poisoning. These observations are the results of the estimation of hexone bases which could be derived by hydrolysis of the liver. They studied the cyanides in the same way and could obtain no such results. While the ferments may be interfered with by the cyanides the mechanism would seem to be different from that which obtains with chloroform.

We are aware that changes in the excretion of uric acid and sulphur compounds are explainable on the grounds of increased autolysis as well as of decreased oxidative changes. Lactic acid, however, is looked upon as a product of "anaerobic metabolism" of sugar. The fact that this substance was excreted at the same

time with the altered amounts of uric acid, sulphur compounds and acetone bodies, led us to the view that oxidative changes involved in the transformations of these substances and their precursors were interfered with. The possibility that this interference is the result of autolytic change in the liver is not excluded. The idea naturally occurred to us that if this interference extended to the transformations which some of the putrefactive products normally undergo these substances might then show increased toxicity. Our experiments were designed to demonstrate this general proposition, and they have shown, we think, that these substances, most notably indol, are far more toxic if given with certain other poisons. One of these, cyanide, exerts a rather specific influence upon the power of cells to utilize oxygen; the other, chloroform, possibly by increasing autolysis, disturbs metabolic processes, among which are oxidations.

As Dr. Edsall has indicated, it is not proved that the conditions which are present in the human body in recurrent vomiting are reproduced in our experiments. We cannot claim that indol or phenol are the sole, or even the main, causes of the attacks. But we believe that by experimental means we have shown somewhat more clearly than has yet been done the character of the effects which may be brought about by some of the products of intestinal putrefaction if the functions which normally accomplish their transformations are temporarily depressed; and that among these effects gastrointestinal symptoms are prominent. We also believe that the urines of the cases of recurrent vomiting which we have examined present indications of a similar interference, but of undetermined cause.

DR. JACOB. — As to the uric acid in the urine, is it cause or effect?

DR. RICHARDS. — I think it is entirely effect.

Treatment of Diphtheritic Paralysis by Antitoxins.—

Mongour, in a communication to the Société de médecine et de chirurgie de Bordeaux (*Journal de médecine de Bordeaux*, November 18, 1906) called attention to the successful use of antidiphtheritic serum in cases of diphtheritic paralysis. He mentioned several instances in addition to others already published, in which the use of antitoxin had rapidly terminated paralytic lesions to refute the statements of certain other clinical observers who had claimed that this serum had no effect on paralytic phenomena. He reaffirmed his conclusions of four years ago, when he published reports of similar cases.—*New York Medical Journal*.

TUBERCULOUS CERVICAL LYMPH NODES IN AN INFANT OF FOUR MONTHS.*

BY L. E. LA FÉTRA, M.D.,
New York.

Simple acute adenitis is common in early infancy; but tuberculous adenitis is very unusual, in this country at least. This case is reported because of its rarity and because of certain interesting questions that arise in connection with it.

The Family History of the little patient sheds no light upon the origin of the affection. Both parents are living and well; neither has ever had a sign or symptom suspicious of tuberculosis in any part of the body. The sister of the patient, a little girl of four-and-a-half years, has been under my care since birth, as a feeding case, and has never had a prolonged cough nor any tuberculosis of the lymph nodes, bones or joints. No nurse nor any servant nor any visitor to the house since the infant's birth has had a prolonged cough. The father of the patient had several colds in the head, repeated one after another, for some weeks before and after the time of the infant's birth.

Personal History.—Allan G. N., Jr., was born October 12, 1905, at full term, the result of the second pregnancy. He was strong and healthy, weighing seven pounds and six ounces at birth. Because of scanty breast milk his nourishment from the beginning was a combination of maternal nursing and bottle feeding. The artificial food was made from the milk of a well-known dairy which has the certification of the New York County Medical Society. The milk is produced under the best conditions upon a model farm; the cattle are Jerseys and Alderneys. After a small initial loss in weight the baby began to gain nicely, weighing eight and one-half pounds when three weeks old, a gain of eighteen ounces in the first twenty-one days. The weather being fine he was sent out of doors after the second week, and all went well until he was about three weeks old, November 4th, when he developed a cold in the head, snuffling and snorting to get his breath, especially during the latter part of the night. There were no

* Read before the Eighteenth Annual Meeting of the American Pediatric Society, Atlantic City, May 30, 1906.

signs in the chest, and the temperature was not over 100° F. This head cold passed off in one week and the baby was well until November 23d, when, at the age of seven weeks, he developed a second cold, this time in the head, throat, tonsils and chest. The tonsils, especially the right, showed a little exudate in the follicles, but very little redness or swelling; there were a few large râles in the chest. The temperature gradually fell from 102° F. the first day to normal on the fourth day.

Under inhalations and internal treatment these conditions were soon improved and the baby was well, save for some snuffling, for two weeks. On December 11th the baby had the third attack of "cold," this time more severe than before. There was fever up to 102° F., much prostration, dyspnea with respirations 60, and the signs of a generalized bronchitis involving the finer tubes. On the fifth day of this attack Dr. Holt saw the baby with me in consultation, and there was serious question of bronchopneumonia. It was decided, however, that the baby had only a severe bronchitis, probably a part of the general grip infection of which it was difficult to get rid. This attack lasted thirteen days, the temperature reaching normal on December 24th, and the chest signs disappearing soon afterward. On December 21st, however, when the baby was ten weeks old, there had been a rise of temperature to $101\frac{2}{3}^{\circ}$ F., and at that time there appeared a slight swelling of the right side of the neck, in front of the sternomastoid muscle; this swelling consisted of three lymph nodes and remained the same size for about ten days; then it increased rapidly for a few days, but without rise of temperature over $100\frac{1}{2}^{\circ}$ F. By January 18th it was as large as a walnut and quite hard and the node outlines were lost. Then the swelling diminished, and by January 29th the three nodes were again distinctly felt, firm, not tender and movable. For ten days they remained about stationary, perhaps a little smaller, and then the perinodular swelling reappeared and the whole mass became much larger. The outlines of the separate nodes were lost and there was indistinct fluctuation in the tense lobulated mass.

Because of the tender age of the patient, I called in consultation Dr. Charles N. Dowd, whose experience in cervical lymph node cases is probably unsurpassed in this country. He thought the condition probably subacute suppurative adenitis, and in accordance with his advice it was planned to open the abscess before the skin became badly involved. On February 17th, under ethyl

chlorid anesthesia, Dr. Dowd operated on the neck swelling. Upon reaching the lymph nodes they were found quite large, soft and hyperplastic; there was no suppuration, contrary to both our expectations, and the nodes when opened showed greyish granular material, but no distinct pockets of liquefaction. There was very little fibrous tissue about the lymph nodes. No attempt was made to do a complete extirpation of all the lymph nodes palpable in the wound; only the largest and most accessible were removed.

A few days later Dr. William C. Clarke reported the microscopic examination from the Department of Pathology of the College of Physicians and Surgeons as follows:—"The lymph nodes from the cervical region of Baby N., operated on by Dr. Dowd, February 17th, are enlarged and softened. Microscopic examination shows extensive early tuberculosis. There are many areas of degeneration and necrosis in the lobules of the nodes. These areas are surrounded by a slight amount of productive inflammation." On account of his interest in this peculiar case, Dr. Clarke showed the sections to several other workers in the laboratory, who confirmed his diagnosis.

The subsequent course and appearance of the wound have been and are typical of tuberculosis; cheesy sloughs continue to come away from the deeper nodes involved, and the skin edges have the blue gelatinous appearance which is diagnostic of this form of inflammation. The mass of the swollen glands in the neighborhood is becoming smaller, and altogether the wound is doing very well. Repeated careful examinations of the lungs, the last time on May 25th, fail to show any signs of tuberculosis, either of the lung or of the bronchial lymph nodes. The infant's digestion has been excellent all along, and his general condition is very good, considering the constant drain of the discharging wound. At the time of the operation, February 17th, his weight was twelve pounds, six ounces; on May 24th he weighed fourteen pounds, thirteen ounces, a gain of two and one-half pounds in a little over three months.*

How shall one account for the tuberculous cervical lymph nodes in this case? It is probable that the first "cold" was taken from the father or from the street dust, and that later, perhaps, through the inflamed tonsil or nasopharynx, the tubercle bacilli

* During the summer of 1906, while away in the country, the baby succumbed to what was apparently an acute enterocolitis: no necropsy was obtained. The wound had never healed.

penetrated to the lymph streams leading to the deep cervical nodes.

In connection with this case, it is of interest to consider, first, the frequency of tuberculous cervical lymph nodes in infancy; second, the source of infection in these cases; and third, the question of latent tuberculosis of the lymph nodes.

RARITY OF TUBERCULOUS CERVICAL LYMPH NODES IN INFANCY.

Although there are abundant statistics upon tuberculous lymphadenitis, there are very few authors that report cases of the disease in early infancy. The cases are grouped as "one to five years," or "one to ten years," as a rule. The affection is very common about the age of the second dentition. Billroth reports that in his experience scrofulous and tuberculous lymphadenitis occurs most frequently between eight and twenty years, but may appear at any age from one to sixty years. He says that the small glandular swellings that come under observation in children under five years old prove mostly to be acute or subacute abscesses. Fränkel made a strong distinction between scrofulous and tuberculous lymph nodes, considering the former a disease of childhood, the latter a disease occurring most frequently between fifteen and thirty years. Among 148 tabulated cases, there was only 1 of Fränkel's under five years.

Fischer, collecting 1,484 cases from various authors, found 59, or 3.9 per cent., under five years of age. Many authors with an experience of over 100 cases had seen only 1 or 2 under five years. Grünfeld, in 214 cases, not 1 under five years. In contrast to these are the reports of Manson, who had 17 under five years in 95 cases, and Gellhaus, who had 8 under five years among 60 cases. Wohlgemuth, however, among 430 cases found the ages as follows:—Up to one year, 54 cases, or 12.5 per cent.; from one to three years, 104 cases, or 24.15 per cent.; from three to five years, 46, or 10.7 per cent.; from five to ten years, 90, or 20.8 per cent.; altogether, 68 per cent. of cases under ten years. Wohlgemuth's figures are so different from all others that they demand an explanation. This is to be found in the fact that his cases are drawn from the out-patient service of the Jewish Hospital, and that these patients are mostly infants and young children living in most unsanitary conditions. As to the region of the body occupied by the affected lymph nodes, the neck was implicated in 93 per cent. of Wohlgemuth's cases. Harbitz, in his

study of latent tuberculosis, referred to later, found 10 cases in patients under one year. Among these the cervical lymph nodes were involved in 9 cases, and alone 8 times.

In this country comparatively little has been written on the subject; but what evidence there is goes to prove that in infants the condition is very unusual. Freeman reports that in 158 autopsies on tuberculous subjects at the New York Foundling Hospital the cervical lymph nodes were macroscopically involved in only 14 cases, or 9 per cent. He considers tubercular cervical lymph nodes as very rare in infants, but frequently the first lesion after the third year. Dowd writes me that my patient is the only case under one year that he has seen in a personal experience of 200 or more cases of tuberculous cervical lymph nodes and that he has had very few under the age of two years. Among 61 of his reported cases, only 3 were under three years of age.

We are, then, I think, justified in concluding that while tuberculosis of the cervical lymph nodes does occur in a small per cent. of cases in patients under three years, the great majority of these cervical swellings are not tuberculous, and that the chances against tuberculosis increase inversely with the age of the patient; *i.e.*, the younger the patient the less the probability that the swollen lymph nodes are tuberculous, and the greater the chance that they are simple inflammatory enlargements due to ordinary pyogenic cocci.

Source of Infection.—In any particular case it may be impossible during life, or even after necropsy, to determine the original site of invasion or the source of infection. Breathing and swallowing are, of course, the only possible avenues of infection, and invasion must take place in the case of the cervical lymph nodes through the mucous membrane of the nasopharynx, oropharynx, tonsils or adenoids. Tracing the infection backward from the lymph nodes along the lymph vessels that drain into the deep cervical chain, one comes upon the tonsils, the adenoids and the nasopharyngeal mucous membrane as the most likely sites of invasion. It is believed by many that the most frequent local sources of infection of the cervical lymph nodes are hypertrophied tonsils and adenoids. Either the tonsils and adenoids may be tuberculous, or they may in their inflamed or debilitated state allow tubercle bacilli to pass through into the lymph vessels beyond. Many authors have called attention to tuberculosis of the tonsils, Cohnheim and Weigert in 1884 being the first. Schlenker in

1893 established the correlation between tuberculosis of the tonsils and tuberculous cervical lymph nodes. In 1894 Lermoyez showed that there are two types of adenoid tuberculosis, one macroscopic and the other recognized only by the microscope. Dieulafoy in 1895 emphasized the frequency of latent or larval tuberculosis of all three tonsils, as determined by animal inoculation. Straus, Wright and others have found tubercle bacilli in the nasal fossæ of healthy individuals. There is no doubt that the bacilli can pass through the mucous membrane without producing any lesion. Cornet, cited by Dowd, brushed tubercle bacilli on the nasal mucous membrane of healthy animals and later found enlarged tubercular cervical lymph nodes, the mucous membrane showing no lesions. Adenoids and large tonsils, by causing mouth breathing and stagnation of the nasal mucus, predispose greatly to tuberculosis of the tonsils and to tuberculosis and suppurative inflammations of the cervical lymph nodes. Though the faucial tonsils may occasionally become infected by tubercle bacilli in the milk or in the sputum (Schlenker), undoubtedly the infection is almost always from the air, either inspired through the nose or inhaled through the mouth.

LATENT TUBERCULOSIS OF THE LYMPH NODES IN INFANTS.

Recently the subject of latent, or as the French call it, larval tuberculosis has engaged a great deal of attention, especially since von Behring's pronouncement that tuberculosis in adults is a development of the latent tuberculosis acquired from the alimentary tract in infancy. Allan MacFadjen and Alfred MacConkey (*British Medical Journal*, July 18, 1904, page 129), in the experimental examination of mesenteric lymph nodes, tonsils and adenoids, pulverized and injected the mesenteric lymph nodes from twenty-eight children. Eight of these children had various forms of tuberculosis, but the other twenty had none; none of the twenty-eight had any intestinal symptoms. Of the twenty autopsied with no tubercular foci found, there were results by the gland inoculations from five children (6 mos., 6 mos., one still-born, one 2½ years, and one 8 years old). In two of these tuberculosis was demonstrated by microscope; so that only in three of these was the tuberculosis truly latent. Their investigation of tonsils and adenoids yielded no positive results. Of greater interest, however, in connection with cervical tuberculosis is the fact that extension to the lungs or other organs occurs in over one-fourth

of those cases in which the lymph nodes are not removed. Why may not many cases of lung tuberculosis arise from latent—not evident—tuberculosis of the cervical lymph nodes?

Harbitz, of Kristiania, in a very interesting and careful monograph, recently published, reviews the literature to 1905 and submits the results of his own investigations of lymph node tuberculosis in children. He makes a particular study of latent tuberculosis, meaning by this the presence of tubercle bacilli in the lymph nodes without any macroscopic or microscopic evidence that they are thus infected. The discovery and proof of the larval bacilli are made by inoculation into guinea pigs. Out of 142 necropsies on children 73 were proved by absence of anatomical changes and by negative inoculation experiments to be free from any infection by tubercle bacilli. Sixty-nine had tuberculous infection, but of these 18 had the infection in latent form in the lymph nodes, discoverable only by inoculation. Of these 18 cases of latent lymph node tuberculosis, 10 occurred in infants under one year; the youngest was one month, twenty-two days, and 5 others were six months old or younger.

As to the particular groups of lymph nodes involved, in 13 out of the 18 cases the cervical chain was infected, and as has been noted heretofore, 10 of these cases were one year old or younger. The occurrence of so many instances of latent lymph node tuberculosis, demonstrable only by inoculation, in this Norwegian series calls attention to the need of more careful study of our cases in this country.

Notwithstanding these frequent findings of tuberculosis in infants, Harbitz is careful to add that enlargement of the cervical and other lymphatic nodes, due to chronic pyogenic infection, is more common in children than is their infection by the tubercle bacillus.

DISCUSSION.

DR. KOPLIK.—I am inclined to believe that the tonsil is not such an infrequent source of infection. Some years ago I published the case of a child of nine months who had been in contact with a grandfather, a tuberculous subject, and developed a tuberculosis of the tonsils and lymph nodes. I was surprised a year or so ago by the autopsy findings in a case of von Jaksch anemia, in which the terminal infection was tuberculosis; there was tuberculous adenitis and the tonsils were the seat of tuberculous infection.

DR. COTTON.—Within the past three months I was called to see a baby six months old, at the breast, that had a little temperature and restlessness. In examining the throat I noticed considerable hyperemia and a little swelling of the faucial tonsils. I had a smear made and left some laxative medicine. The case fell into the hands of another physician. Ten days later when again called I found that the child had had some temperature ever since I had seen it. The lymph nodes below the angle of the jaw, which had shown very little involvement at first (the smear showed nothing but staphylococci), had become about as large as an English walnut. It seemed rather hard, somewhat tender and the child was fretful. Within a week, three weeks from the first visit, I noticed a little softening. At that time I was going out of the city and called my assistant to watch the case. He made a bacteriological examination and demonstrated it to be tuberculosis without question. It was obstinate in healing and the discharge became somewhat chronic. There seemed to be a gland deeper which had not broken down. The edges of the wound everted, kept open and formed a keloid around it. The fistula finally closed completely some six weeks later. The child meanwhile maintained its weight very well and cut two teeth.

DR. J. H. HESS (guest), Chicago, passed around two photographs showing primary infection of the bronchial lymph nodes, with secondary involvement of three or four lumbar vertebræ.

Metabolism of Iron in Infants.—Krasnogorski concludes an elaborate study (*Roussky Vrach*, December 9, 1906) of the metabolism of iron with the following postulates: The compounds of iron in mother's milk are much more readily absorbed by infants than the same compounds in goat's milk. Infants absorb much more iron from raw milk than they do from boiled milk. Although mother's milk contains a small percentage of iron, this is compensated by the more rapid absorption of iron from breast milk. Raw goat's milk does not furnish a sufficient amount of iron for the maintenance of health in infants. Spinach and the yolks of eggs also contain readily absorbable iron for infants, but are less valuable in this respect than mother's milk. The natural iron in the food is much more readily absorbed by infants than the iron preparation manufactured by chemists. The insufficient supply of iron to infants may lead to serious nutritive disorders, disturbances of growth, and to anemia.—*New York Medical Journal*.

THE SACRAL OR SOCALLED "MONGOLIAN" PIGMENT SPOTS OF EARLIEST INFANCY AND CHILDHOOD, WITH ESPECIAL REFERENCE TO THEIR OCCURRENCE IN THE AMERICAN NEGRO.

BY JOSEPH BRENNEMANN, M.D.,

Instructor in Pediatrics, Northwestern University Medical School,
Chicago, Illinois.

Whoever has carefully examined recently born children of the darker races, notably the Mongolian and the African, has been struck by the nearly constant presence in the sacral and sacro-gluteal regions of irregular areas of bluish pigmentation that contrast rather strongly with the general body color. For centuries Japanese physicians and writers have discussed and striven to interpret the occurrence of such pigmentation in children of their race, where it forms a peculiarly striking picture. Since Baelz first introduced this subject to the Western scientific world about twenty years ago, a great deal has appeared in German, French and Japanese literature about this peculiar phenomenon that is of interest from many points of view. In this discussion American anthropologists and physicians have taken a relatively insignificant part. This seems all the more strange because we have so great a wealth of easily accessible material at our very doors. Because of the inadequate treatment at the hands of our anthropologists of the phenomenon in question, and because of the fact that so few medical men, in my experience, know even of its occurrence, to say nothing of its meaning and distribution, it has seemed to me appropriate that some one should assemble the array of observations that have been made in the last few years and present them in the hope that they will prove of interest both to the anthropologist and to the clinician. I will review briefly the literature of this subject, especially that of the last few years, and will record my own observations on children of the American negro.

Our earliest records come from Japan. The well-marked, deeply pigmented blue spot of the Japanese baby forms a striking contrast with the general body color. It may well be described as a type to which those of all other races may be compared. In

the sacral, or sacro-gluteal, region of nearly all recently born Japanese children are found one or more well-defined, distinctly blue or grayish blue spots varying in size from that of a small coin to that of an expanded hand. They may extend over both buttocks, or into the lumbar region, and isolated spots of identical nature may be found over the back, or shoulders, or extensor surfaces of the extremities—almost never on the ventral and flexor surfaces. They are not raised above the surrounding skin. They are not influenced by pressure or even made plainer by contrast with a blanched surface. In nearly all cases this pigmentation is present at birth and during the latter months of intrauterine life. It may, however, appear weeks and even months after birth. The blue color deepens for a time, then gradually fades away, leaving no trace after a few years. It rarely persists to the sixth or seventh year and only very exceptionally to adult life.

In Chinese and other Mongolian peoples identical spots are found with the same characteristics, except that their color is reported as more bluish gray than blue. Chemin found it in 89 per cent. of Chinese children during the first year, in 71 per cent. during the second year, and in 19 per cent. from the third to the eighth year. Matignon found it in 97 to 98 per cent. of pure Chinese up to two and a half years of age, in 10 to 12 per cent. after four years, and only rarely after the fifth year.

In 1885 Baelz, a German physician who held a clinic in Tokio for many years and married a Japanese woman, called the attention of European scientific men to this characteristic of the Japanese race. His observations extended to other Mongolian peoples and he considered it a distinct racial characteristic. It was he who introduced the term *Mongolen Fleck* into German literature, where it is still used extensively. When later he found similar spots in two Indian children in northern Vancouver, British Columbia, he considered the occurrence to furnish an argument in favor of Mongolian descent of the American Indian. Baelz made careful microscopic examinations of these spots in Japanese children and described large pigment cells deep in the corium, that were peculiar to them. A series of articles appeared from this author up to 1902.

More than a hundred years before this time Saabye, a Danish missionary, noted these spots in newborn Eskimo in Greenland. His notes were not published until 1816.

In 1849 Eschricht published his accurate observations on Eskimo children.

In 1895 Grimm treated the subject from a morphological standpoint so exhaustively that little has been added to it (Adachi). He examined, macroscopically and microscopically, these areas of pigmentation in Japanese children and confirmed the findings of Baelz. He found the characteristic pigment cells deep in the corium as early as the fourth month of fetal life and states that the spots begin to appear at this time.

It remained, however, for a Japanese, Buntaro Adachi, working in the laboratory of the German anatomist Schwalbe, in Strassburg, to place the whole subject on a firm scientific basis. In 1903 he published the results of his exhaustive study of pigmentation of the skin in man and monkeys. He had long believed that these pigment spots were not distinctly Mongolian as taught by Baelz, and he started out to look for the casual cells in the skin of white children. His findings led him into a study of pigmentation in general in man and monkeys, and to a special study of the morphology of the "Mongolian" spot. He examined sections of the skin from a great many different places in each of seventy-six Europeans, including seven embryos, and of twenty-six monkeys of different kinds. In both man and monkeys he found pigment in the epidermis and corium independent of one another, more or less in the same proportion, and very variable in amount in different races and individuals.

It was the pigment found in the corium that was especially significant. This he found in two distinct layers of pigment-bearing cells:—

1. A faint layer of small cells high up in the corium, close to but entirely separate from the well-known deeply lying epidermal pigment. These were found widely distributed, but of little importance.

2. A deeper layer made up of much larger spindle-shaped or stellate cells, forming in sections a distinct horizontal band deep in the corium. In monkeys these are found widely distributed, and their amount is usually inversely proportional to that of the epidermal pigment. If both epidermal and deep corium pigment are scant, the general color of the monkey is pale, or flesh-colored, as in the lemur. If the former is abundant and the latter scant or absent, the color is brown, as in the chimpanzee. If the opposite

condition prevails, *i.e.*, little epidermal pigment and much deep corium pigment, we get the well-known shimmering blue color of certain monkeys like cynocephalus, macacus, etc. If both pigments are very abundant we have the dirty bluish brown color of the orangoutang.

In man those deep corium cells are found only in limited areas, usually in the sacro-lumbo-gluteal region, where, if sufficiently abundant to show through the overlying layers, they appear to the eye as our blue pigment spots. These are the same cells that Baelz and Grimm had described many years before. In both man and monkeys these deeply-lying dark pigments appear blue on the surface in accordance with the same law that makes black carbon appear blue in the tattoo mark. In fact, many of these spots resemble nothing else so much as tattoo marks.

Adachi's classical work, so far as it pertains to the human being, is limited to the white European. Yet in 10 out of 24 cadavers of white children up to two and a quarter years of age he found these characteristic large pigment cells deep in the corium, always in the sacral region only, except in 4 cases where they were found in the gluteal region also. In the remaining 52 cases he found them only twice, and with some difficulty. In none of 7 embryos did he find them, and only twice in 7 newborn children. The maximum occurrence was from the sixth month to the third year rather than at birth. It will be remembered that Grimm found them in the Japanese fetus at the fourth month. In none of these cases could a blue spot be demonstrated, although it would be difficult to do so on a cadaver with the usual postmortem discoloration. Adachi reasoned that this evanescent pigmentation is a normal human characteristic, found in different degrees in all races. The last few years have amply shown how well grounded are his findings and also the theories he based on them.

Observations have come from all sides. How universal this peculiar phenomenon is, that only a few years ago was considered a sign of Mongolian descent, is shown by an enumeration of the various races and peoples from whom definite reports have been obtained. I have spoken of the Japanese and the Chinese. In sections of the latter Birkner (1904) demonstrated the casual deep corium cells. Among Koreans these spots were reported by Baelz and Sekiba; Anamites by Chemin; Malayans by Kohl-

brugge and Baelz; Javanese by Kohlbrugge, ten Kate, Deniker, and Baumgarten; Indonesians by Kohlbrugge and Riedel; among the inhabitants of the Celebes and other islands of the Pacific by Riedel; Igorrotes of the Philippine Islands by R. M.; Samoans by von Bülow; Hawaiians by Okabe, ten Kate, and Baelz; among the Eskimos by Hansen, Saabye, and Eschricht.

Among Indians they were reported by Baelz, who found them in two children in northern Vancouver, British Columbia. Starr (1903) examined all of the seven babies of a Maya Indian village in Central America, and found on all of them a bluish, or bluish purple, spot, limited to the sacral region and disappearing by the tenth month. Three half-breeds did not show it. Lehmann-Nitsche (1904 and 1905) reports his observations in Araucanian Indians in Argentina. He found a pigment spot as large as a hand in the sacral region, extending to the gluteal and lumbar regions, with occasionally an accessory spot. He considers the term violet, or mulberry colored, as most distinctive, and states that the color did not differ strikingly from the rest of the body color. No definite observations are reported, to my knowledge, on Indians of the United States.

Among half-breeds, such as Chino-Japanese, Chino-Malays, and others, where both races have it normally, the spot is found.

Among Euro-Japanese, Aino-Japanese, and other mixtures of dark and white races, the spot nearly always occurs, but is fainter, less extensive, and disappears earlier (Grimm). If the child strongly resembles the white parent it is more apt to be absent than in the darker children. Among Euro-Japanese Baumgarten found it in 90 per cent. of cases.

From Africa we have no very definite reports. Adachi refers to Pruner Bey, Schweinfurth, and von Helmholtz, who noted in newborn African children grayish or slate-colored spots in various regions of the body. Although no statements are made as to definite localities, there seems little doubt, after my own observations, that what they saw was our pigment spots. R. M. speaks of their occurrence among the Negritos of the Philippine Islands, Riedel among the Papuans, and Chemin reports an observation in Madagascar. Baelz speaks of their occurrence among mulattoes of Brazil, Lehmann-Nitsche (1904-05) examined critically half a dozen negro half-breeds of Argentina between six months and two and a half years of age. He found a sacral spot

as large as a hand, violet, gray or slate-colored, not blue, as in the Japanese, and not strikingly different from the rest of the body color. He does not report its presence in other parts of the body. Among these people the spot is known as *la mancha morada* (violet or mulberry colored spot) and the author suggests the adoption of this term by Spanish writers. Wardle (1902) points out the opportunity for study of this subject in this country and regrets that no one has seized it.

There is no record of microscopic examination of such spots in negro children. Frederick (1905) records an exhaustive study of the skin of a four-months colored child in Schwalbe's laboratory. He refers to Adachi's work, but apparently made no observation on these pigment spots.

Ashmead, of New York, at one time foreign medical director of the Tokio Hospital, Japan, in a recent compilation (1905) defends the strange thesis that the presence of this spot always means negro descent! He contributes no new facts or observations.

During the last few months I have carefully examined 40 colored children under one year of age with reference to the occurrence and distribution of these pigmented areas. The American negro of whom one can say with assurance that he has no white blood is rare. One must think of practically all of these babies then as of mixed white and black blood—in no case, however, of this generation—but always going back at least two or three generations. The color varied from that of a white baby to that of an adult negro, from white through light brown to black. In only 2 cases was there any other known admixture; in these there was some Indian blood.

About one-half of these cases were less than one week old. There seems still much uncertainty as to the degree of color in the newborn negro child. Adachi (1903), for example, says: "One finds everywhere mentioned that the newborn negro enters the world with the same white skin that the European does. And yet not rarely travellers speak of faintly-colored newborn children of the black race." A colored child of very light parents may be indistinguishable at birth, so far as color is concerned, from a white child, but the ordinary colored child enters the world noticeably pigmented, and many are very black from the start. The color deepens for some years, especially in

those born very light. The deepest black of the adult full blood, however, one rarely, if ever, sees in the newborn.

Of these 40 cases, 35 showed well-marked areas of bluish pigmentation at the time of examination. In one other child of nine months nothing could any longer be made out with certainty. Shortly after birth, however, there was a deep blue sacral spot as large as a hand that has disappeared only in the last few months.

Two other babies of seven and nine months respectively did not show the spot, and the mothers stated that it never had been present. In these 2 cases it may easily have been overlooked earlier. Another child was seen only during the first two weeks. It was very light and may have developed the characteristic spot later, although I have never seen a case in which it appeared after birth. One other baby I saw a few days after birth and again at four months. This child and both parents were very light brown. The child was darker at the last examination, but no spot was present at any time. All of these four children were very light except one, nine months old, who was very dark. I think one may safely assume that in this case the spot was present earlier and that if any was left it was covered by a heavy black epidermal layer of pigment. The spot was seen in 90 per cent. of cases and probably occurs in at least 95 per cent. of ordinary colored children before they reach the second year.

In the remaining 35 cases there was always a distinct area, usually of maximum intensity, at the very point where the rima glutea widens out on the sacrum. This area varied in size from that of a dime to that of a dollar, showed no special symmetry, and was not abruptly defined. In 24 cases similar areas were found on the buttocks; in 19, in the lumbar region; in 8, each on the back, shoulders, and extensor surfaces of the legs and feet; in 4, on the extensor surfaces of the arms and hands—only once on a flexor surface—never on the ventral surface nor on the head or neck. The color varied from a dull bluish gray, or slate color, to a distinct dull deep blue, or violet, or plum color. Lehmann-Nitsche, it will be remembered, found the color in mulattoes of Argentina "violet gray or slate-colored, not blue as in the Japanese" and "little distinct from the rest of the body." The personal equation enters very much into finer determination of shades of color. I have seen well-marked Mongolian spots on two Chinese babies and was impressed by their resemblance in

every way to those found in brownish colored babies. The contrast of blue and brown differed but little in intensity, it seemed to me, from that of the Mongolian. In darker and older babies a dark slate blue often merges imperceptibly into the surrounding black.

Four or five of the cases had peculiar spots that appeared *sui generis*. The latter were always round, sharply defined, about one-half to one centimeter in diameter, deeply blue, looking exactly like tattoo marks. They were all in the gluteal or lumbar region, except in 1 case where there was one on one shoulder and two on the other.

I will describe a few cases in detail to convey a more definite idea of what these areas are like in the colored child.

1. Baby W., a typical case, æt. five months. One grandparent on each side white. Child was "almost white" at birth—considerably darker now. Small irregular area of distinctly bluish discoloration at upper end of rima glutea, more or less continuous with a bluish spot the size of a half-dollar over the right, and two each the size of a quarter over the left, buttock. Slight bluish discoloration over the lower portion of the lumbar region. More marked at birth than now. Began to get darker two weeks after birth; increased in intensity till about one month ago. Then "real blue" according to the mother. Since then fading rapidly and child getting darker. When seen one month later all of the spots were much paler.

In many cases only a sacral spot was found. In others the distribution was so widespread that I believe one is justified in thinking that there are colored babies whose general color effect at a given time is bluish or violet black rather than black, or brown, *i.e.*, cases in which deep corium pigment—if we may assume its causal relationship—exceeds, or at least equals, that of the epidermis. I will cite 2 additional cases that illustrate this point.

2. Baby B., æt. eight months. Medium brown color. Mother and father moderately dark brown. Great-grandfather white. Dark blue wedge-shaped spot at upper end of rima glutea; raphe and adjacent sides dark blue. Fairly well marked over inner side of right buttock; at upper end of same a small, round, sharply defined spot 1 cm. in diameter, deep blue like a tattoo mark. Greater part of the left buttock discolored bluish; maximum at

middle. Few small bluish spots in the lumbar region and on the back. One just back of the *ant. sup. sp.* of the ilium: pale blue, size of a dollar. Broad transverse band of bluish discoloration across the upper part of the back and over the left shoulder. Few small spots on extensor surfaces of left upper and forearm. Faint spot on dorsum of left hand. Bluish discoloration over right deltoid and on dorsum of right hand. Four well-marked spots each the size of a cent on extensor surface of left leg, ankle and foot. Eight to ten spots a few millimeters in diameter on upper extensor and lateral surface of left thigh. Bluish area in front of the right ankle the size of a dollar. I examined this child four months later. All spots were very much paler or had disappeared. The bluish pigmentation was doubtless more intense prior to my first examination.

3. Baby H., æt. three and one-half months. Medium brown; parents same. Grandfather white. Deep blue spot at lower end of sacrum, size of silver half-dollar. A number of small paler spots over buttocks and lumbar region. Area of pale blue along left side extending from near axilla to costal border and toward the spine, about two by four inches in extent. Similar spot on right side nearly as extensive. Round spot 1 cm. in diameter on left shoulder, like heavy tattoo mark. On left shoulder a similar spot 1 by 2 cm. in area, and back of the right clavicle another, 2 mm. in diameter. A very distinct, sharply defined, pale blue area in front of the left knee and tibia, the size of a dollar. A narrow bluish band clear around the right ankle, *i.e.*, also on the flexor surface. Many other portions of the body gave one the impression of a bluish tint. The mother did not know whether there had been much change since birth or not. An older brother had convulsions and was deeply cyanotic before this baby's birth. The mother thought that the present baby was "marked" by her seeing her blue baby.

It was impossible to establish any definite relationship between the intensity of these spots and the amount of white blood in any given case, because of the uncertainty concerning ancestors more than one or two generations removed. I think it is probable that the actual amount of pigmentation is greater in black children, while as a matter of fact it usually appears more conspicuous in lighter brown children. Black very easily obscures dull blue, while brown forms a favorable contrast. On the whole, the de-

gree of pigmentation of these spots and its extent vary so widely in different cases that one can predict nothing definitely from the degree of general pigmentation.

I have examined a great many older colored children, but have not tabulated my results. After the first or second year it

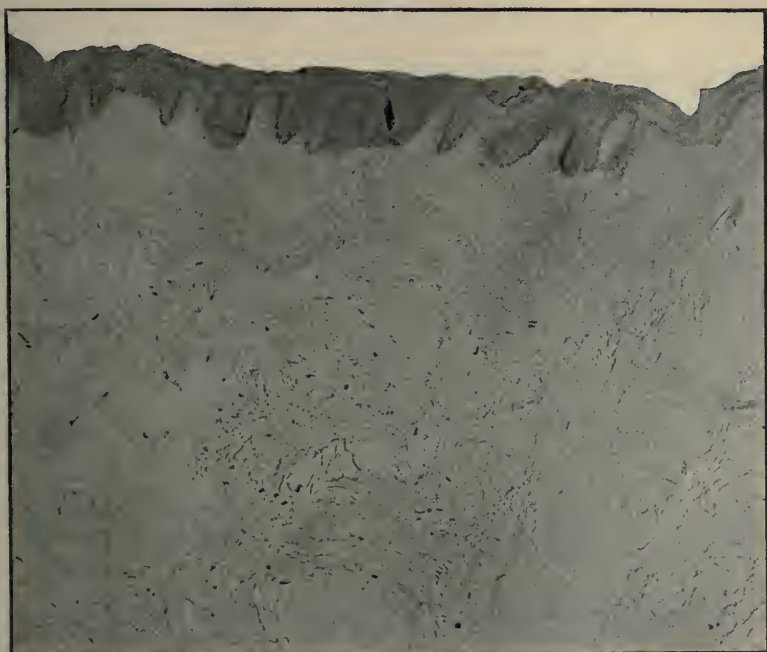


FIG. 1. MICROPHOTOGRAPH OF UNSTAINED SECTION ($20\ \mu$) OF SKIN FROM THE LOWER SACRAL REGION OF A STILL-BORN NEGRO CHILD. THE EPIDERMIS SHOWS THE USUAL PIGMENTATION OF THE STRATUM MALPIGHII. THE UPPER THIRD OF THE DERMIS IS WHOLLY FREE FROM PIGMENT. THE LOWER TWO-THIRDS ARE DOTTED WITH THE LARGE, DARK, SPINDLE-SHAPED PIGMENT CELLS THAT CAUSE THE BLUE "SACRAL SPOT."

becomes impossible to decide in the great majority of cases whether a spot is still present, hence statistics would have no value. By this time the areas have become faint or absent, and the dark epidermal pigment has covered the remnant. I have never seen a spot well marked after the third or fourth year.

Sections from the skin of the sacrum of a moderately pigmented still-born negro child were examined microscopically. The

child was apparently normal in every way, death having been due to strangulation by the cord wound about the neck. The mother was black, the father was said to be much lighter; both probably had some white blood. No blue spot could be made out, but the child had been dead twenty-four hours when examined. Post-mortem discoloration and probably opacity of the superlying skin would naturally obscure such spots. From the degree of general

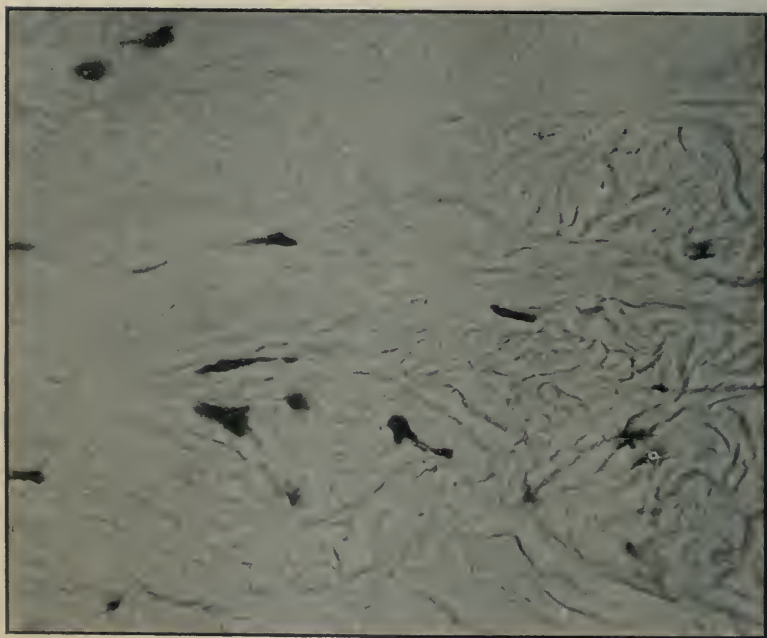


FIG. 2. SAME AS FIG. 1—MORE HIGHLY MAGNIFIED (ABOUT 600 DIAM.). SECTIONS UNSTAINED, 20 μ THICK. THE LARGE PIGMENT CELLS SHOW AS IRREGULAR BLACK MASSES EMBEDDED IN THE CONNECTIVE TISSUE OF THE DERMIS.

pigmentation of both mother and child I feel certain that a well-marked pigment spot would have been present if the child had been born alive.

Two pieces of skin were examined—one from the median line at the lower end of the sacrum, in which place it will be remembered the spot was always found if present at all; the other from the less-pigmented ventral surface of the chest near the axilla.

The skin from the chest was thin; the epidermis showed well-

marked brownish granular pigmentation in the deeper layers. *No pigment could be found in the corium.*

The sacral skin was much thicker. The epidermis contained the same brown granular pigment in the usual location, but in greater amount than in the other sections. The upper part of the corium was apparently wholly free from pigment cells for a depth varying from one, more commonly two, to three times the thickness of the epidermis. The remainder of the corium, from four to six times the thickness of the epidermis, was thickly strewn with large pigment cells that formed a very striking picture in unstained sections under the low power of the microscope. These cells were for the greater part spindle-shaped; frequently, however, they were stellate or branched, or irregular in shape. In many of them distinct oval nuclei could be seen. The rest of the cell was packed with rather coarse brown pigment granules, of the same tint as the epidermal pigment. In many places one could see only irregular masses of these granules, probably due to a tangential section of a cell. The cells were large, commonly from three to ten times the length of the ordinary connective tissue fibres. With a No. 6 Leitz objective as many as fifteen to twenty of them could often be found in one field in sections twenty μ thick.

So closely do these cells resemble in every way those described by Baelz, Grimm, Adachi and Birkner, in Japanese, Chinese and Caucasian children, that no doubt can remain as to their identity. This demonstration of these cells in another race in which the blue pigment spot is so prominent a feature still more firmly establishes their causal relationship to these peculiar areas of pigmentation.

Adachi's conclusion that these pigment spots were found in all races of mankind still required verification by demonstration on a pure Caucasian child. Sekiba, in a letter to Adachi, stated that he found the pigmentation present sixteen times in 150 children of pure Ainos, a primitive, nearly extinct, white race of northern Japan. Grimm, Koganei and others denied its presence in this white race, but their observations were very limited. Baumgarten, in a letter quoted by ten Kate, says: "In Europeans of pure blood, too, this spot occurs, but rarely." Tsuboi, in a personal communication to Adachi, said that it occurred in Europeans during embryonic life, but that it disappeared before birth.

This view has had no confirmation and is distinctly opposed by Adachi's findings.

The first well-authenticated case in a European child was reported by Adachi himself and a Japanese colaborer, Fujisawa, in the same number of the *Zeitschrift für Morphologie und Anthropologie*, in which his main work appeared. Fujisawa, after examining fifty children in Seitz's clinic at Munich, found one of apparently pure Caucasian lineage who had two faint but distinct bluish spots. Nothing was noticed at birth, but a week later the grandmother observed on the right buttock a small round bluish or slate-blue spot. A week later she found another one as large as a thumb on the same buttock and partially concealed in the rima glutea. Fujisawa reported the same case two years later (1905) in greater detail. The spots were still present but much paler. A second child, born to the same parents, had three distinct bluish spots with the same characteristics as those of the older child. One naturally thinks of a possible contamination with a dark race. Epstein, of Prag (1906), refers to the historical fact that in the thirteenth century Mongolian hordes penetrated as far west as Olmuetz in Maehren. The father's people came from this region. One might attribute these spots, then, to a recurrence of a remote ancestral characteristic or to a persistence, in spite of very great dilution, of a tenacious race characteristic. The occurrence of 2 cases in the same family would seem to add weight to this theory.

If this objection to Fujisawa's cases leaves doubt as to the occurrence of the *Mongolen Fleck* in pure white children, the further report of Epstein (1906) should remove any doubt from the mind of an unprejudiced person. He describes 5 cases that he has seen in the last two years, and estimates the total number of cases that he has seen in the last twenty years at 25. In his earlier cases he was at a loss to explain them. All of the 5 reported cases were children under fifteen days old, except one that was ten months old. The latter was seen again at two and one-half years. The large, well-marked, blue or blue grey spots were still visible, but smaller and paler. The spots in these white children apparently differed in no essential way from those found in darker races. The color was bluish, or bluish grey, and in every case they were found in the sacro-lumbar-gluteal region. He estimates their frequency in white children at about one in 600.

With the report of these well-authenticated cases from a country where racial contamination can be excluded with considerable certainty, there seems little doubt that the *Mongolen Fleck* of Baelz is found also in the white race and so in all races of mankind. The constancy with which we find the identical characteristics of location, time of occurrence, duration and color (always blue, or bluish, or violet) seems to leave no doubt that in all these cases we are dealing with the same morphological entity, although the causal pigment cells of Baelz and Grimm have been demonstrated in only a few races.

What significance shall we attach to this peculiar phenomenon, and how interpret it biologically? A characteristic so striking is sure to find many explanations and to give rise to many superstitions. Among the common people of Japan it has been considered a result of coitus during pregnancy (Adachi), or as a mark made by the god Kami-Sama, who presides over births. Japanese writers have offered many solutions. In the seventeenth century Soha Hatona, and his sons after him, applied a paste to the spots to purify the blood. Siguen Kagawa (1765) believed that the obi, or common belt, of the Japanese women, decomposed the blood of the mother, and this, stagnating, affected that part of the child lying closest to the abdominal wall, *i.e.*, the sacral region. Ransai Kagawa, a great obstetrician, more than a hundred years ago thought that it was due to contact of that part of the fetal body with the placenta. Hisao Yamada (1851) and Ritsuen Asado (1870) held the same view. Shiusei Omaki (1826) attributed its presence to the hot food taken by Chinese and Japanese mothers, the heat descending through the mother decomposing the blood and causing it to settle in the most dependent part of the fetus, the sacral region, or the shoulders and back, depending on the position of the fetus. Shinsai (1846) thought it due to coitus during pregnancy, the heat of the semen decomposing the blood of adjacent portions of the child in such a way that contact with the air caused it to turn blue.

Among Samoans the spot under consideration is considered a sign of Samoan origin. Half-breed Indians of Brazil call it *genipapo* because of its resemblance to the bluish grey color of an indigenous fruit. *Tem genipapo* means "he has Indian blood." Brazilians state that the spot has a marked tendency to persist in half-breeds even if no new Indian blood enters in. Some pious

Brazilians think of it as the "seal of Cain." Among Haiwaiians the spot is called *he ila*, and the common people think it is due to the pregnant mother eating the fruit of a plant called *popolo*, which has a dark violet color when crushed. Among the Mayo Indians it is called *uits* or *pan* (bread), and it is an insult to speak of it (Starr). Araucanian mothers know of its occurrence, but attach no significance to it (Lehmann-Nitsche). In parts of Argentina, as above mentioned, it is called *la mancha morada*, or simply *la mancha* (Lehmann-Nitsche), and it is merely considered a sign of African blood. It often persists here, it is said, for a long time, even to adult life, and such expressions as "He has the mancha morada," or "He has the violet tail," or "He has the spot on the tail," are used to designate a man as mulatto, or to insult or offend him.

An interesting observation is reported by the same author in Globus (1905) from Santiago del Estero, Argentina. The spot is here considered pathological, and the child's foot is therefore pressed against the bark of a certain kind of tree and its outline cut with a knife. The bark is then lifted out. When this defect heals over the spot will have disappeared!

I have questioned nearly all colored mothers whose babies I have examined to see what view they took of it. I have been unable to find any evidence of superstition regarding its presence. A considerable proportion of them had never noticed it—had never heard of it—even many whose children were well marked. Others knew that their babies had a bluish mark, that it was the rule for colored children to have such marks, and they looked on it as they would on other negro characteristics. As one mother put it, "They say it shows that a person is a real negro." I was surprised to find a number who considered these spots as birth-marks peculiar to their children. One very intelligent mother was watching with the keenest satisfaction the disappearance of this peculiar "birth-mark"—that she had never discussed with anyone and so did not know of its general occurrence. Still another whose baby had a large dark bluish purple spot thought her baby "marked by a plum"! Many of them were very much amused at my interest in these spots, but none seemed to have the slightest reticence about speaking of them.

Among men of science an idea was current, before Adachi's work was published, that perhaps these spots were a storehouse

for pigment to be used as needed. Wardle (1902) states such a view as follows:

"May not these evanescent congenital pigmented areas be regarded as the nuclei of more general pigmentation, the regions wherein occurs the first deposition of the cutaneous pigment normal to the darker races and peoples, and is their apparent disappearance not to be explained by the deepening of the tint of the whole body surface?"

Ashmead (1905) gives as strange and unique an interpretation for one who is familiar with Adachi's work, as is his whole theory that "wherever you find black blood contaminating white there you will find the mulberry spot of Japan"—and, by inference, nowhere else! I quote his view without further comment:

"For myself, I believe that there is furnished to the offspring in utero, by the negro or negroid parent, too much pigment in the blood which must circulate through the placenta and the child during gestation. The excess settles in the part least developed, of least resistance in development or undevelopment, where another member once had been formed in distant ancestry; it is therefore of rudimentary growth. The child of such parentage cannot get rid of its excess before birth, in the shape of meconium or otherwise. The tendency in colored races is to the skin outwards, and not inwards. Thus metabolism is insufficient to rid the system of what was necessary to human creation thousands of years before the white man appeared."

Epstein (1906) still considers the phenomenon here dealt with a valuable Mongolian race characteristic, and thinks it "justifiable to look upon the blue spots occurring exceptionally in the sacral and neighboring regions of white children as abnormal phenomena that are probably to be attributed to pathological factors in fetal development." If this spot has been found in practically all other races of mankind it is difficult to see why we should hesitate to acknowledge its morphologically identical nature in the white race when Adachi has demonstrated in the same region, at the same time, in the same portion of the corium, apparently the same pigment cells that cause the spot in darker races.

The view held by Adachi that we have here to deal with a rudimentary formation can alone, it seems to me, explain satisfactorily these strange spots. In monkeys epidermal and dermal pig-

ment are formed independently and have presumably the same function. Either one or the other may be the more prominent in any locality, which being dependent on the species. In man epidermal pigment alone plays an important part. It too is formed independently of that in the corium. In the latter, the superficial widely distributed layer is very insignificant. The deeper lying pigment cells of the corium still persist in man as a localized transitory condition, limited normally to the latter part of intrauterine life and the first few years of infancy and childhood. In darker races, where there is more pigment in general, these cells are still sufficiently abundant to appear as the bluish spots of the sacro-lumbo-gluteal region and of other localities where pigmentation is normally deep, persisting for a variable time, in isolated cases only, to adult life. In the race of least pigmentation, the Caucasian, the same pigment cells are present under nearly identical circumstances, in nearly one-half of all children under two and a quarter years of age (Adachi)—probably in a larger percentage of cases if each one could be examined in all stages of its development. Very exceptionally only do they occur in sufficient numbers, or concentration, to be visible as our blue spot.

We must think, then, of this pigmentation as a normal human characteristic, not a recurrence of a *lost* ancestral condition, *i.e.*, atavism, as suggested by Bloch, but the *persistence* in rudimentary form of what was once perhaps a more widespread and functional layer of pigment such as exists in certain monkeys.

It is interesting in this connection that in the higher or anthropoid apes there is a tendency to predominance of epidermal over corium pigmentation. One cannot, however, classify monkeys systematically on this basis. Neither can one reason that the greater prominence of sacral spots—*i.e.*, deep corium pigmentation—places the darker races nearer the common ancestor of man and monkey. Degree of pigmentation is determined by other factors, and the intensity of these spots is rather directly proportional to the degree of general pigmentation of the race and of the individual. Even in the white race both spots and cells have been found almost exclusively in dark individuals.

The occurrence at a certain stage, only, of early development is in accordance with our knowledge of many such vestigial structures. I need only mention lanugo hairs, the cauda humana,

gill slits, etc. These corium cells would naturally appear at about the same time that the permanent epidermal pigment does. For a time both increase in intensity, then one gradually fades away. So in the Japanese our pigment cells are found at the middle of intrauterine life—in the Caucasian, after birth.

Why this remnant should favor the sacral and adjoining regions, when there is no such tendency in monkeys, for example, has not been explained. We are no nearer to a real solution when we suggest a possible connection with a primitive tail, or with a relatively late differentiation of the posterior end of the body which makes it *sui generis*, as shown, for example, by the comparatively frequent occurrence of pathological conditions and anomalies peculiar to this region. The frequent occurrence of these spots in other favored locations, such as the shoulders, the back, the extensor surfaces of the extremities—in nearly one-half of my cases—would lead us to think of possible vestigial deep pigmentation in any location where epidermal pigment is normally most abundant, following a general law in both man and monkeys, that epidermal and corium pigment are found more or less in the same proportion (Adachi). We know, too, that as a general law corium pigment is more abundant on the trunk than on the extremities (Adachi). One naturally thinks of a possible persistent ancestral tendency to deeper pigmentation in the sacral and adjoining regions, as for example in certain baboons, notably the mandrill, although at present there is no further evidence to support this view.

We can no longer consider these spots as exclusive race characteristics. They are to be accorded the same value as other racial traits—color, hair, features, etc. Their presence or absence in given cases leads to highly probable but not positive determination as to race or to degree of contamination. This is of especial interest to us in this country.

RECENT LITERATURE.

For other literature prior to 1902 see Adachi (1).

1. Adachi, Buntaro. "Hauptpigment beim Menschen und bei den Affen." *Zeitschrift für Morphologie und Anthropologie*, 1903, Vol. VI, pp. 1-131.

2. Adachi und Fujisawa. "Mongolen Kinder Fleck bei Europaeern." *Ibid.*, pp. 132-3.
3. Ashmead, A. S. "The Mulberry-colored Spots on the Skin of the Lower Spine of Japanese and other Dark Races; a Sign of Negro Descent." *Journal of Cutaneous Diseases*, May, 1905, Vol. XXIII., pp. 203-14.
4. Baelz. (a) "Die Koerperliche Elgenschaften der Japaner." *Mitt. d. Deutschen Ges. f. Natur und Voelkerkunde Ostasiens*, 1885, Vol. IV., p. 40. (b) "Noch Einmal die blauen Mongolen Flecken." *Centralblatt für Anthropologie*, 1902, pp. 329-31.
5. Bartels. "Die Sogenannten Mongo'len Flecken der Eskimo Kinder." *Zeitschrift für Ethnologie*, 1903, pp. 931-5.
6. Birkner, F. "Die Hautfarbe des Menschen und die blauen Sogenannten Mongolen Flecken." *Correspondenz-Blatt der deutschen Gesellschaft für Anthropologie, Ethnologie und Urgeschichte*, 1904, pp. 18-22.
7. Bloch. "Preuve atavique de la Transformation des Races." *Bull. de la Soc. d'Anthropol. de Paris*, 1901, Vol. II., Series 5, p. 618.
8. Chamberlain, A. F. "Pigment Spots." *American Anthropologist*, 1902, N. S., Vol. IV., p. 796.
9. Epstein, A. "Ueber den blauen Kreuzfleck und andere mongoloide Erscheinungen bei Europaeischen Kindern." *Jahrbuch für Kinderheilkunde*, January, 1906, pp. 60-73.
10. Frederick. "Zur Kentniss der Hautfarbe der Neger." *Zeitschrift für Morphologie und Anthropologie*, Stuttgart, 1905, Vol. IX., pp. 41-56.
11. Fujisawa, Kocko. "Sogenannter Mongolen—Geburtsfleck der Kreuzhaut bei Europaeischen Kindern." *Jahrbuch für Kinderheilkunde*, August, 1905, pp. 221-224.
12. Grimm. "Beitraege zum Studium des Pigmentes." *Dermatologische Zeitschrift*, 1895, Vol. II., Heft 4, pp. 328-342.
13. Lehmann-Nitsche, R. (a) "La Mancha Morada de los Recien Nacidos." *La Semana Medica*, Buenos Aires, May 19, 1904. (b) "Die dunklen Hautflecken der Neugeborenen bei Indianern und Mulatten." *Globus*, 1904, Vol. LXXXV., pp. 297-309. (c) "Die dunklen Geburtsflecken in Argentinien und Brazil." *Ibid.*, 1905, Vol. LXXXVIII., p. 112.
14. Starr, Frederick. (a) "Data on the Ethnography of Western Mexico." Part II., 1902. (b) "Sacral Spots of Mayo Indians." *Science*, 1903, N. S., Vol. XVII., pp. 422-3.
15. Ten Kate, Herman F. (a) "Die Pigment Flecken der Neugeborenen." *Globus*, 1902, Vol. LXXXI., pp. 238-40. (b) "Die blauen Geburtsflecken." *Ibid.*, 1905, Vol. LXXXVII., pp. 53-58. (c) "Neue Mitteilungen ueber den blauen Geburtsfleck." *Zeitschrift für Ethnologie*, Berlin, 1905, Vol. XXXVII., pp. 756-8.
16. Wardle, H. Newell. "Evanescant Congenital Pigmentation in the Sacro-lumbar Region." *American Anthropologist*, 1902, N. S., Vol. IV., pp. 412-20.

PYELITIS IN INFANCY AND CHILDHOOD, WITH REMARKS ON THE URINE.*

BY LOUIS FISCHER, M.D.,

Visiting Physician to the Willard Parker and Riverside Hospitals,
New York.

In the series of cases of pyelitis observed by me, three groups of symptoms stand out prominently:—

First.—Fever, intermittent in character, progressive emaciation and constipation or coprostasis.

Second.—Bed-wetting and pains evidenced by crying while urinating, passing of small quantities of urine at a time, as though afraid to pass more because of pain; absence of fever throughout the whole course of the disease.

Third.—Distinct digestive disturbances mostly marked by the passage of scybalous masses, and feces intermingled with shreds of membrane. There is marked anorexia, but fever is very rarely present.

The diagnosis in these cases was made by the microscopic examination of the urine. It emphasizes the importance of securing a specimen of urine in every case of infantile disease. This is a difficult matter at times, but a careful mother or nurse will rarely fail to secure a specimen by applying a sterile pad of absorbent cotton or by watching the opportunity when the infant has not voided urine for some time. In rare instances only have I been compelled to catheterize. The examination of the blood was made in all cases to exclude malaria and for the differential leukocyte count.

The presence of continued fever in an infant is a very distressing symptom. When such fever assumes the type so well known as an intermittent fever, a diagnosis can only be made by resorting to laboratory aids in conjunction with the current methods of physical diagnosis. A case of mine with intermittent fever, in which chills and high fever existed every afternoon, had an enlarged spleen and marked perspiration. There were morn-

* Read before the Section on Pediatrics, New York Academy of Medicine, December 13, 1906.

ing remissions and evening exacerbations. The blood examination showed an absence of plasmodia besides a marked leukocytosis. The differential count showed a very high polynuclear percentage. There was cough and coryza. I suspected pus in some part of the body, perhaps an encysted empyema. The urine examination, however, cleared up the diagnosis, as we found albumin, blood-cells, pus and spindle and caudate epithelial cells and hyaline casts. The diagnosis of pyelitis was made after a careful examination of the external genitals, so that we could exclude abscess of the vulva or other local external influences.

All cases seen by me have shown a marked disturbance of the gastrointestinal tract, either marked constipation or coprostasis.

Bed-wetting the First Symptom of Pyelitis.—Infant K. S., about two years old; previously wet-nursed and later fed on home modification of cow's milk. Had slight rachitic enlargement of the epiphyses of the long bones and distended pendulous abdomen. Has been subject to recurring coryza due to adenoids and also showed marked proteid indigestion. Has had no infectious diseases, and in addition to an occasional attack of gastric fever suffered from bronchitis for one whole winter, with temperature ranging between 102°-104° F. Has had eczema on the cheeks. Gags and vomits easily; anorexia as a rule; is restless at night; an overactive child, always moving about, running or playing with something while eating. Sneezes very frequently, sometimes three or four times in succession. While in apparent health the child seemed to "take cold" easily. When first seen by me the child sneezed and the nose discharged. The child had wet her bed for one week. No other symptoms were reported.

I examined a specimen of the urine microscopically, and found that it contained pus corpuscles, blood, hyaline and epithelial casts. The child seemed distressed when passing urine, and tried to avoid it. Had urethral irritation and awakened several times during the night with pain, desiring to urinate. The temperature was normal, the appetite poor; she was playful and seemed to all appearances normal. There was a tendency to constipation, and occasionally slight membranous masses were expelled with the stool. On microscopic examination these membranes proved to be fibrin. The clinical history further elicited that the infant had wet the bed. On obtaining a specimen of urine I was surprised to find a large quantity of milky-looking fluid.

The following clinical and bacteriological examinations of the urine supplement the clinical data and confirm the diagnosis of pyelitis.

Kathleen S. February 23, 1906.

Reaction.—Acid. *Color.*—Light amber. *Sediment.*—Moderate. *Odor.*—Not offensive. *Nature of the Sediment.*—Heavy. *Specific Gravity.*—1.030, at 15°C. *Albumin*, heat and acid test.—Present. Nitro-magnesium test.—Present. *Amount.*—Esbach test.— $\frac{1}{4}$. *Sugar*, cupric test.—Negative. Bismuth test.—. *Amount.*—None; per cent. by weight. *Bile Pigment.*—Negative. *Acetone.*—Negative. *Urea.*—3.076 per cent. by weight. *Chlorides.*—1.2; per cent. by weight. *Indican.*—No excess. *Phosphates.*—No excess.

SEDIMENT.

Blood.—Few cells. *Pus.*—Moderate amount. *Mucus.*—Small amount. *Casts.*—Some hyaline and epithelial studded casts. *Bacteria.*—No tubercle bacilli found. *Epithelium.*—Few bladder cells. *Crystalline and Amorph. Matter.*—None. *Other Structures.*—None.

REMARKS.

The noteworthy features in the specimen are: The presence of albumin as stated, with few blood cells, a moderate amount of pus, and some hyaline and epithelial studded casts, with a high gravity and a corresponding relative amount of urea.

(Signed) FREDERIC E. SONDERN.

Kathleen S. February 26, 1906.

Reaction.—Acid. *Color.*—Light amber. *Sediment.*—Moderately marked. *Odor.*—Not offensive. *Nature of the Sediment.*—Heavy. *Specific Gravity.*—1.020, at 15°C. *Albumin*, heat and acid test.—Present. Nitro-magnesium test.—Present. *Amount.*—Esbach test.— $\frac{1}{4}$. *Sugar*, cupric test.—Negative. Bismuth test.—Negative. *Amount.*—None; per cent. by weight. *Bile Pigment.*—Negative. *Acetone.*—Negative. *Urea.*—1.582. *Chlorides.*—0.9; per cent. by weight. *Indican.*—No excess. *Phosphates.*—No excess.

SEDIMENT.

Blood.—Few cells. *Pus.*—Rather large amount forming bulk of the deposit. *Mucus.*—Small amount. *Casts.*—Few hyaline

casts. *Bacteria*.—No tubercle bacilli found. *Epithelium*.—Many bladder cells. *Crystalline and Amorph. Matter*.—None. *Other Structures*.—None.

REMARKS.

The specimen compared with the last one as per Report No. 19,156 of February 23d, shows about the same amount of albumin and few hyaline casts, with a normal gravity and a somewhat depressed relative amount of urea.

While some of the purulent sediment is doubtless of renal origin, this specimen seems to indicate some vesical involvement. A causative factor is not apparent.

(Signed) FREDERIC E. SONDERN.

Subsequent growth of colon bacillus reported by telephone.

Kathleen S. February 28, 1906.

Reaction.—Acid. *Color*.—Amber. *Sediment*.—Very moderate. *Odor*.—Not offensive. *Nature of the Sediment*.—Heavy. *Specific Gravity*.—1,018, at 15°C. *Albumin*, heat and acid test.—Very faint trace. Nitro-magnesium test.—Very faint trace. *Amount*.—Esbach test.—Same; per mille by weight. *Sugar*, cupric test.—Negative. Bismuth test.—Negative. *Amount*.—None; per cent. by weight. *Bile Pigment*.—Negative. *Acetone*.—Negative. *Urea*.—2.520; per cent. by weight. *Chlorides*.—0.6; per cent. by weight. *Indican*.—No excess. *Phosphates*.—No excess.

SEDIMENT.

Blood.—None. *Pus*.—Some cells only. *Mucus*.—Small amount. *Casts*.—Exceedingly few hyaline casts. *Bacteria*.—No tubercle bacilli found. *Epithelium*.—Some bladder cells. *Crystalline and Amorph. Matter*.—None. *Other Structures*.—None.

REMARKS.

The specimen compared with the last one as per Report No. 19,190 of February 26th, shows a very faint trace of albumin only and exceedingly few hyaline casts, with a normal gravity and a corresponding amount of urea.

There is also a marked decrease in the amount of pus.

(Signed) FREDERIC E. SONDERN.

Kathleen S. March 4, 1906.

Reaction.—Acid. *Color.*—Pale amber. *Sediment.*—Moderate. *Odor.*—Not offensive. *Nature of the Sediment.*—Heavy. *Specific Gravity.*—1.019, at 15°C. *Albumin,* heat and acid test. —Trace. Nitro-magnesium test.—Trace. *Amount.*—Esbach test. —Trace; per mille by weight. *Sugar,* cupric test.—Negative. Bismuth test.—Negative. *Amount.*—None; per cent. by weight. *Bile Pigment.*—Negative. *Acetone.*—Negative. *Urea.*—2.198; per cent. by weight. *Chlorides.*—0.8; per cent. by weight. *Indican.*—No excess. *Phosphates.*—No excess.

SEDIMENT.

Blood.—None. *Pus.*—Moderate amount. *Mucus.*—Small amount. *Casts.*—Exceedingly few hyaline casts. *Bacteria.*—No tubercle bacilli found. *Epithelium.*—Some bladder cells. *CrySTALLINE and Amorph. Matter.*—None. *Other Structures.*—None.

REMARKS.

The specimen compared with the last one, as per Report No. 19,236 of February 28th, shows a little more albumin and exceedingly few hyaline casts, with a normal gravity and a corresponding relative amount of urea.

The purulent sediment is increased in amount and would seem referable to the renal pelvis.

(Signed) FREDERIC E. SONDERN.

Supplementary Report.—March 5th. Rapid culture tests for the colon bacillus resulted negatively.

The urine varied several times a day, so that while one specimen contained pus, blood, casts and albumin, a second specimen, taken six hours later, after marked alkaline treatment, was almost clear.

An interesting feature of this case was the presence of the bacterium coli communis. Another interesting point in conjunction with this case was that in addition to the pylitis, marked symptoms of cystitis appeared with dysuria. The infant showed such pain that she cried when passing urine and would frequently pass but small quantities. Marked dyspeptic symptoms were associated during the whole attack. Judging by the bacteriological findings I am led to believe that this case was a true infection of

the colon bacillus and should be classed among the type of cases known as ascending pyelitis. The external genitals showed a slight inflammatory redness with no visible catarrhal discharge.

The noteworthy features of this case were: That the child was playing out of doors and in apparent good health up to the day that I saw her. Had it not been for the catarrhal rhinitis the family would not have sent for me, although the child had enuresis nocturna for several days prior to the rhinitis.

This case illustrates forcibly the necessity of examining the urine for formed elements, and also shows that a pyelitis can exist without causing severe systemic disturbances, as this child had no fever and nothing that would indicate kidney disease. This infant was under observation for several months and gradually recovered and is in good health to-day.

In 1900 I presented a girl,* fourteen years old, to this Section, who was under treatment for supposed malaria for about two years. She lived in the country at that time and was brought to the city because of constant emaciation in addition to persistent fever and chills. She also suffered occasionally with cough, which led to the diagnosis of tuberculosis by the attending physician. When first seen she was a pale, emaciated child. Her muscles were soft and flabby, the bowels moved sluggishly. Appetite poor and abdominal pains located on her right side. The examination of the abdomen showed a large mass which felt hard and was a nonfluctuating tumor. The mass felt as large as an infant's head at full term. I advised an operation to relieve this condition. A total extirpation of the right kidney was made and the pathologist reported it to be a case of chronic pyelitis. Judging by the symptoms presented to me, this case must have existed a very long time. The daily range of temperature was from 100°F. to 102°F.

Tonsillitis a Forerunner of Pyelitis.—Another case seen recently, child about eight years old, suffered with an acute tonsillitis. The lacunæ were covered with small pin-point yellowish-white particles. The highest temperature was 104°F. and there was marked prostration and intense thirst. A culture from the throat showed the presence of streptococcus pyogenes aureus. The submaxillary glands were not enlarged. With the aid of aconite in minim doses, and phosphate of soda in 15 grain doses,

* Published in ARCHIVES OF PEDIATRICS, January, 1901.

besides inhalations of steam impregnated with creosote, the child convalesced and was apparently well in three days. One week later the urine contained pus and blood. Thus it is evident that nose and throat infections, in addition to the more common acute infections like scarlet fever and diphtheria, may give rise to or predispose to pyelitis in addition to nephritis.

Adenoid Vegetations with the Presence of Enuresis Nocturna.—In this case the adenoids were removed because the enuresis was regarded as a reflex neurosis. H. B., female, four years old, bottle-fed during infancy, suffered from constipation and passed scybalous masses frequently. There was an intermittent period of loose bowels alternating with this constipation. No previous illness, no infectious disease. When seen by me the child had had fever for three weeks, the fever being of marked intermittent type. There were chills at times very marked, and also sweating. There was marked emaciation. The diagnosis of intermittent fever had been made. The blood examination did not reveal any plasmodia. The enuresis was associated with the presence of adenoids and looked upon as a reflex neurosis, for the relief of which the adenoids were removed before the case was sent to me. The urine being cloudy, a specimen was sent to Dr. Sondern, who reported that the specimen contained a trace of albumin, few blood and numerous pus cells, and exceedingly few epithelial casts, besides spindle and caudate cells; there was a normal gravity and a corresponding relative amount of urea.

Baby B. March 25, 1906.

Reaction.—Acid. *Color.*—Dark amber. *Sediment.*—Moderate. *Odor.*—Not offensive. *Nature of the Sediment.*—Heavy. *Specific Gravity.*—1.019, at 15°C. *Albumin,* heat and acid test. —Trace. Nitro-magnesium test.—Trace. *Amount.*—Esbach test. —Trace; per mille by weight. *Sugar,* cupric test.—Negative. Bismuth test.—Negative. *Amount.*—None; per cent. by weight. *Bile Pigment.*—Negative. *Acetone.*—Traces. *Urea.*—2.158; per cent. by weight. *Chlorides.*—0.7; per cent. by weight. *Indican.*—No excess. *Phosphates.*—No excess.

SEDIMENT.

Blood.—Few cells. *Pus.*—Numerous cells. *Mucus.*—Small amount. *Casts.*—Exceedingly few epithelial casts. *Bacteria.*—No tubercle bacilli found. *Epithelium.*—Very few bladder cells.

Crystalline and Amorph. Matter.—None. *Other Structures.*—None.

There were traces of acetone and an excess of urobilin.

The diagnosis of pyelitis was made and the child ordered an alkaline medicine and a bland unirritating diet consisting of milk, cereals, and fruit. The case was then lost sight of for a number of months; when seen again the urine showed the presence of exceedingly few blood cells and few pus cells, no albumin and no renal elements, with a normal gravity and a corresponding relative amount of urea.

A review of these 4 cases shows the following: First, that pyelitis presents a variety of symptoms resembling intermittent fever with marked exacerbations and remissions in the temperature. Second, that pyelitis is occasionally met in infancy as an afebrile type, and were it not for the presence of the enuresis no symptoms associated with the genitourinary tract would have been present to direct attention to the kidneys.

It is well to remember that pus may be found in the body without showing the presence of fever, hence too great stress should not be placed on the absence of fever as a guide to the presence or absence of pus.

It is very important to rule out all possible errors in the diagnosis, and thus the most careful examination of the external genitals should be made to exclude an abscess at or near the Bartholin's gland. So also must we be sure that a vulvovaginitis is not present, otherwise the urine will be contaminated by the presence of the pus from this region. An interesting point in conjunction with these cases is that they all occurred in female children.

While in my first case the presence of the bacterium coli was easily demonstrated, it is impossible to say that nothing else but the bacterium coli caused this condition. Escherich, and more recently Trumpp and Finkelstein, demonstrated the development of cystitis by the bacterium coli.

We must never rely upon the examination of one specimen of urine as a positive guide in the diagnosis. Urine varies so frequently during twenty-four hours that both morning and evening specimens should be taken separately and examined for the presence of morphotic elements.

Baginsky, in *Archiv. für Kinderheilk.*, 1897, Vol. XXI,

reports a case in which the morning specimen was clear and free from albumin and formed elements, whereas the afternoon specimen contained pus corpuscles in addition to casts and albumin.

Treatment.—The general plan of treatment consisted in enforcing rest in bed or on a couch. The general hygiene consisted in ordering ventilation several times a day besides a sponge bath or a warm tub bath every evening. To allay the irritation of the genitals and the pain during urination a warm demulcent bath, such as an oatmeal bath of the strength of 2 pounds oatmeal in the bathtub half full of warm water, was used. In the absence of oatmeal a bran bath was given. The diet consisted of milk diluted with alkaline waters, cereals, fruits and fruit juices and gelatine puddings. Meat, and even eggs, were excluded during the acute stage. Water, to which phosphate of soda or bicarbonate of potassium was added in 5 grain doses, was ordered three times a day. Benzoate of soda may be given in the same dose and as a substitute for bicarbonate of potassium. It is well to remember that urotropin does not act well in a highly alkaline urine. The urine is usually very acid.

Urotropin in $2\frac{1}{2}$ grain doses was ordered three times a day. While urinary symptoms improved during the urotropin treatment, it was frequently necessary to omit the drug for twenty-four hours or more, as it seemed to irritate the gastric mucosa and disarrange the appetite.

(The discussion of this paper will be found on page 468.)

65 East Ninetieth Street.

Aspirin in Chorea.—Massalongo and Zambelli (*Gazz. degli Osped.*, January 21, 1906) have tried aspirin in many ordinary cases of chorea with good results. In 4 cases of very severe chorea they have had equally satisfactory results. In the beginning they gave from 3 to 5 grams daily (the patients varied from ten to fifteen years), and reduced it to 2 or 3 grams later. Some good effects were noticed as early as the second day, and chiefly showed themselves in the direction of lessened disturbance in the movements of the mouth and head, so that feeding became much less troublesome and some sleep was obtained. Treatment varied from fifteen to twenty-five days in duration. The authors were particularly impressed with the value of the drug in their 4 severe cases, and believe that no other remedy as yet proposed is as effectual as aspirin.—*British Medical Journal.*

Clinical Memorandum.

SPASM OF THE GLOTTIS COMPLICATING WHOOPING-COUGH.*

BY MAURICE O. MAGID, M.D

New York.

There are on record only two cases of pertussis reported during the last ten years with spasm of the glottis as a complication.

My patient is a male infant, one year old, breast-fed, with no predisposition to nervous disorders. He has had catarrhal bronchitis from time to time since birth. During the entire month of May of this year he suffered from a severe bronchitis. During the same month two other children in the family had acquired pertussis, and in the early part of June my patient commenced to cough with the characteristic "whoop."

On June 15th, while being examined, the infant had a paroxysm of coughing, and when the paroxysm was almost ended, the infant's face suddenly changed to a deep blue color, the hands and feet became flexed and stiff; then the entire body relaxed and the infant looked as though dead. I found the heart-beat very feeble and slow. Every means was tried to resuscitate the infant, but only after forty seconds did he respond by a feeble cry. These spasms recurred several times during that day. During the intervals the infant would laugh and play, and one examining him would not believe that five minutes before he was almost dead. The attacks increased in number in spite of all anti-spasmodic treatment.

On the 27th of June the infant was sent to the mountains. There was no improvement during the first three weeks, as the spasms recurred three and four times during each hour. During the remaining four weeks of his stay the spasms became less frequent, numbering four or five a day. The spasms would come on at the slightest disturbance in the surroundings, not necessarily with the cough. The infant would be asleep, when suddenly the mother would hear a peculiar sound, then the infant would go off

* Reported at the Eastern Medical Society, November 9, 1906.

into a spasm. Slamming the door caused a spasm. Loud talking or the barking of a dog brought on a spasm.

The mother, having seen little improvement in the infant while at the mountains and being greatly inconvenienced there, decided to come home. While on board the Albany day boat the infant was taken with a spasm which lasted about three minutes. The physician on board pronounced the infant dead. The mother placed the infant into a hot bath and he opened his eyes.

After a few days in New York, during which time he became much worse, the mother took him to the seashore. There the air seemed to be too strong for him, for at the slightest wind he would have a spasm. As there was no improvement after two weeks' stay, the baby was taken back to the city and kept in a quiet and secluded room, with the windows wide open night and day.

About this time the case was seen in consultation by Dr. W. P. Northrup, who said: "I never saw a worse case of convulsions from whooping cough." Later Dr. Louis Fischer saw this case in consultation with me. He found on palpation a very thickened and infiltrated epiglottis. Owing to the extreme sensitiveness of the larynx, and the ease with which paroxysms were excited, he advised pertussin. It was decided, moreover, to resort to intubation should cyanosis again become marked. Meanwhile the infant improved and intubation was not required. There was no decided evidence of rachitis nor of persistent thymus.

No medicine was given for awhile, the main reliance being upon good nourishment and fresh air. Steak juice, broths, and abundant fresh water were given and the bowels were kept open. No great improvement was seen until in September, when the incisors came through; since then the baby has had no attacks.

309 East Tenth Street.

Hemophilia in the Newly Born.—R. C. Larrabee (*American Journal of Medical Science*, March) puts on record a death from this cause on the fifth day after birth. There were multiple hemorrhages from the skin, mucous membranes and cord. An interesting feature is the exception to the laws of heredity shown in the history of the patient's family. In this there had occurred 15 known cases of hemophilia, of which 6 were females. Of these 15 cases, 10 inherited the disease through a male parent. These figures do not include 7 cases of slight severity, or those with incomplete histories.—*American Journal of Obstetrics*.

ARCHIVES OF PEDIATRICS.

JUNE, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAMLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

Contributors and Correspondents, see page III.

THE BRITISH TUBERCULOSIS COMMISSION.

The most comprehensive investigation of Tuberculosis in late years is embodied in the recent report of the Royal Commission, appointed by the British Government to inquire into the relation of human and animal tuberculosis. This Commission owes its inception to the view propounded by Koch at the International Medical Congress held in London in 1900, to the effect that human tuberculosis is unable to give rise to tuberculosis in the ox, and that bovine tuberculosis cannot be transmitted to man. After over four years of experimentation, conducted at several experimental farms especially equipped for this investigation, the Commission has issued its eagerly awaited report.

The first subject of inquiry was, whether tuberculosis in animals and man is one and the same disease. Until Koch's startling statement to the contrary this was generally considered to be a fact. It would lead us too far afield even to summarize the experiments undertaken to determine this proposition. They include a consideration of the anatomical, histological and bacteriological features of tuberculosis produced in animals infected with bacilli from bovine and human sources. Considered from these varied standpoints the Commission concludes that, although differences exist, tuberculosis in man and in animals is essentially the same disease, that these differences therefore are not of kind but of degree. Moreover, that "the human body can be infected by bovine tuberculosis," and that "the bovine body can be infected by tuberculosis of human source, in some cases to a complete, in others to a limited, extent; bovine animals and man can be reciprocally infected." This position from a biological standpoint is contrary to that which is generally held in this country and elsewhere, inasmuch as the two forms of bacilli are considered by most investigators, since the work of Theobald Smith, to be distinct and definite species. As regards the possibility of man being infected from bovine sources it is in full accord with the generally accepted view. Our governmental reports, the publications of the German health department, the investigations of many individuals, have all upheld this opinion, until now it may be considered as definitely proven. So that in this particular the British report must be looked upon rather as strong, confirmatory evidence. We have not relaxed our vigilance against bovine tuberculosis, but have, on the contrary, following rational judgment and clinical experience, protected ourselves more and more zealously against the products of tuberculous cattle.

The material for the inquiry consisted of thirty cases of tuberculosis "occurring naturally in the ox," and sixty cases of tuberculosis occurring in man at different ages. It is in the latter group of cases that we are more especially interested, although

an examination of tuberculosis in cattle, demonstrating once more that the bovine bacillus is constant and stable in type, and thus capable of being considered a standard in the estimation of bacilli obtained from other sources, certainly required additional verification. The cases of tuberculosis in man are divided into three groups. Group I. comprises fourteen cases of bovine origin, caused by bacilli of the bovine type, which differ in no respect from those found in cattle; one of these, it should be noted, was cultivated from sputum. Group II. consists of forty cases which showed a bacillus of the human type, and which are considered of human origin. Group III. contains six atypical strains. The cases are drawn from the postmortem room and the operating room, the former including mainly pulmonary and intestinal or mesenteric tuberculosis, the latter cervical gland and joint tuberculosis. The Commission found it could not rely upon morphology, the size and shape of the bacilli, for a differentiation of the types, but was enabled clearly to make the above groupings as the result of a study of the cultural characteristics of an organism and the reaction resulting from inoculation into rabbits and cattle. This method of differentiation is in accord with that now employed by most investigators.

We must, however, guard against formulating false theories as the result of a consideration of these sixty cases. It is pointed out that fourteen of the number proved to be infections of bovine origin, and that twenty-eight were due to an infection through the alimentary tract. Truly a very large proportion! However, these figures cannot be used to uphold that "a very considerable amount of disease and loss of life, especially in the young, must be attributed to the consumption of cow's milk containing tubercle bacilli." These cases must be regarded purely as selected cases, and therefore can furnish no data by which to judge of the most frequent path of natural infection. The fact that nineteen of the sixty cases consisted of primary tuberculosis of the abdominal cavity, mainly mesenteric gland tuberculosis, shows that they

must be looked upon as carefully selected. We certainly do not meet with nineteen cases of primary abdominal tuberculosis among sixty. But the figures are still more significant, if we disregard the operative cases and consider only the postmortem material. We then find that of the thirty-four cases selected at autopsy for investigation, nineteen were of primary abdominal tuberculosis. This number is far in excess of what has been encountered in routine examination. Indeed we would not expect to meet with nineteen cases of primary abdominal tuberculosis in children, among an autopsy material of some hundreds of cases. Thus, although there is no doubt that the Commission found a large proportion of intestinal and alimentary tuberculosis, and although this may prove to be a very frequent mode of infection, the above figures cannot furnish us with data as to the incidence of such infections in general. For us to gain an insight into the relative dangers of infection with bovine or human tubercle bacilli, a differential study of unselected cases taken from the clinic and postmortem room will be necessary. Only in this way can we gain an approximate knowledge of the relative peril to which children are exposed by tuberculous milk and by contact with tuberculous individuals.

The Commission has not yet completed its appointed task. In this interim report it has furnished us with a mass of the most instructive and interesting scientific data, and has sounded a warning against the use, in whatsoever form, of the milk from tuberculous cows. The main practical lesson to be deduced is the necessity of a rigid inspection and supervision of all cattle which furnish food products to man. In a further report it will consider "under what conditions the transmission from animals to man takes place, and what are the circumstances favorable or unfavorable to such transmission." This, no doubt, will embrace the much mooted question of the portal of entry of the tubercle bacillus, and perhaps, also, the question of latent infections, the two important issues in the etiology of tuberculosis at the present time.

ALFRED F. HESS.

Bibliography.

Consumption : Its Relation to Man and His Civilization ; Its Prevention and Cure. By **John Bessner Huber, A.M., M.D.**, Fellow of the New York Academy of Medicine; Member of the National Association for the Study and Prevention of Tuberculosis; Visiting Physician to St. Joseph's Hospital for Consumptives; Member of the Advisory Board, the New Mexico Cottage Sanatorium, etc. Pp. 458 + 69 pages of Appendices + 9 Index pages. Philadelphia and London: J. B. Lippincott Co., 1906

In this entertaining volume Dr. Huber has given an admirable presentation of the general subject of Tuberculosis in its relation to Civilization. The work is addressed, as noted in the preface, to both the physician and the layman, and is therefore free from technicalities. The subject has been contemplated and discussed in a broad way. Consideration has been given to the history of consumption, its cause, predisposing influences, the effects of overcrowding, sanitary condition of the home, particularly of "lung blocks"; and then there is taken up the general study of Prevention and Treatment, including a complete survey of the Sanatorium system. The author discusses also the administrative measures that have been made use of in America and abroad, as well as the efforts of charitable associations to combat the disease.

Numerous tables and illustrations add to the completeness of the text, and the book can be recommended to both physician and layman as a valuable one for study and reference.

Progressive Medicine. Vol. 1, March, 1907. A Quarterly Digest of Advances, Discoveries and Improvements in the Medical and Surgical Sciences. Edited by **Hobart Amory Hare, M. D.**, Professor of Therapeutics and Materia Medica in the Jefferson Medical College of Philadelphia. Octavo, 280 pages, with illustrations. Per annum, in four cloth-bound volumes, \$9.00; in paper binding, \$6.00, carriage paid to any address. Philadelphia and New York: Lea Brothers & Co.

This number of *Progressive Medicine* contains articles on the Surgery of the Head, Neck and Thorax, by Charles H.

Frazier, M.D.; Infectious Diseases, Including Rheumatism and Pneumonia, by Robert B. Preble, M.D.; on Diseases of Children, by Floyd M. Crandall, M.D.; on Rhinology and Laryngology, by D. Braden Kyle, M.D., and on Otology, by B. Alexander Randall, M.D. The discussion of the Contagious Diseases of Childhood includes a careful résumé of the literature, and there is a particularly good study of Cerebrospinal Meningitis. Under the Growth and Development of Children are considered the topics, The Incidence of Disease, Weight of Infants and Children, Effect of Loss of Sleep, Dentition, Enuresis and Nervousness in Children. There is a careful consideration also of Infant Feeding, both by maternal nursing and by artificial food. Some experiences with the use of Citrate of Soda are reported. The book maintains the high standard of previous numbers.

Peterson's Obstetrics. The Practice of Obstetrics. By **Eminent Authorities.** Edited by **Reuben Peterson, A.B., M.D.,** Professor of Obstetrics and Diseases of Women in the University of Michigan, Dept. of Medicine and Surgery, Ann Arbor, Mich. Large octavo, about 1,087 pages, with 523 engravings and 30 full-page plates in colors and monochrome. Cloth, \$6.00 net; leather, \$7.00 net; half morocco, \$8.00 net. Philadelphia and New York: Lea Brothers & Co., 1907.

This valuable treatise has been written by a number of the foremost American Obstetrists and Gynecologists under the editorship of Dr. Reuben Peterson. The pathological and histological portions have been treated by specialists in those lines, and the book is a distinct addition to the literature of midwifery.

There is a section of the book devoted to the New-Born Infant: its Anatomy, Physiology, Management and Care, and chapters on the Premature Infant, Artificial Feeding and Injuries and Diseases of the Newlyborn. An interesting illustration is De Lee's Portable Incubator Ambulance (a specially adapted dress-suit case) for carrying premature infants to the hospital, where they can be placed in an incubator. For artificial feeding the percentage method is advised, and the suggestion is given to use egg albumen to increase the percentage of proteids in those cases

where there is difficulty in the digestion of sufficient milk proteid. Simple rules for obtaining definite percentages are given.

The book is admirably gotten up, and the illustrations are especially excellent, most of them being originals and beautifully reproduced.

The New Hygiene. Three Lectures on the Prevention of Infectious Diseases. By **Dr. Elie Metchnikoff**, of the Pasteur Institute, Paris. With Preface by **E. Ray Lankester**. Pp.104 + 4. Price, \$1.00. Chicago: W. T. Keener & Co., 90 Wabash Avenue, 1906.

This little book contains three very interesting chapters upon the subjects of Hygiene of the Tissues, Hygiene of the Alimentary Canal, and Hygienic Measures Against Syphilis. These subjects are discussed from a broad philosophical point of view, and take into consideration the most recent work on the great problems upon the production of immunity, and the general methods of the spread of infections. The author opposes Wright's theory of the opsonins being the cause of immunity, concluding that immunity against infective agents is the result of a phagocytic action, or, in other words, that immunity is a function of the cells. To enhance the phagocytic action Metchnikoff advocates the use of horse serum injected into the peritoneal or pleural cavity.

As regards the avenue of infection by tubercle bacilli, the author agrees with von Behring, that in many cases tuberculosis of the bronchial lymph nodes is the result of ingestion of tubercle bacilli into the alimentary canal, with subsequent absorption through the intestinal wall. The author also believes that in many instances the infection of appendicitis is due to inoculation of the infecting agent by the bites of intestinal worms, particularly the oxyuris. His method of treatment in those cases of appendicitis in which the ova of intestinal worms or the oxyuris are present in the feces, is to give thymol.

To prevent infections by food the author is in favor of using boiled water, boiled milk, stewed fruits, and all other foods thoroughly cooked. As is well known, he favors the employment of lactic acid bacilli in the form of artificial buttermilk, or in the

form of a powder, to counteract the action of putrefying and other pathogenic bacteria in the alimentary canal.

The chapter on syphilis is very interesting, detailing as it does many of the experiments with monkeys, and advocating finally the inunction of mercurials as a useful prophylactic measure in man.

Feeding Rules for Healthy Infants. By **Charles Douglas, M.D.**, Professor of Children's Diseases and Clinical Medicine, Detroit College of Medicine; Consulting Physician to Harper Hospital; Senior Physician to the Protestant Orphan Asylum; Member of the Ohio State Pediatric Society; American Medical Association, and Michigan State Medical Society. Containing Educational and Record Charts Showing Practical Percentage Feeding without Laboratory Assistance. Pp. 278+7. Price, \$1.00. Detroit, Mich.: Baby Book Co., Publishers, 1906.

This little book represents the conclusions of a very careful practitioner. Though it is dedicated to mothers and nurses, it is so full of detail that it would probably be of greater use to any physician who has not had a thorough hospital experience in the diseases of children. The directions to mothers in regard to the feeding chart are especially good, inculcating as they do careful observation of all symptoms, accurate record of the amount of food and water taken and of the gain in weight. Numerous cases, with their charts, are cited, with explanations of the symptoms and their causes. The author found in general that the infants did better with comparatively low fat and comparatively high proteid, an experience which agrees with that of the reviewer.

There is a very good summary of feeding rules in the form of a catechism, and a good index completes the book.

Scurvy in Children Produced by Commercial Sterilized Milk.—Comby reported to the Société médicale des hôpitaux (*La Tribune médicale*, October 27th) a peculiar case of scorbutus in an infant, which at the outset had all the appearances of acute articular rheumatism, and subsequently developed pseudo-paraplegia. The condition appeared to be attributable to feeding the infant upon sterilized milk; and was cured by change of food and appropriate treatment.—*New York Medical Journal*.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, December 13, 1906.

MATTHIAS NICOLL, JR., M.D., CHAIRMAN.

SPLENOMEGALY, WITH SPECIAL REFERENCE TO ETIOLOGY.

DR. ELI LONG presented the 3 following cases:—

CASES I. AND II.—Twins, boy and girl, aged nineteen months. Father and mother healthy, no specific history. These are the last of nine children, all living except two, one of which died from diphtheria; the other was killed in accident. There have been no miscarriages.

These babies were entirely breast fed until one month of age, when they were given supplemental bottles of Borden's bottled milk, modified, not pasteurized or sterilized. Living on the ground floor, the children were kept out of doors so much that the neighbors spoke of them as "living on the street."

If we may believe their mother, they have never been ill; in fact, never saw a doctor before this time.

On examination the most striking feature is their very pale skins, especially that of the girl. Well nourished, slight rickets, etc. Spleen of girl extended about $2\frac{1}{2}$ inches below free border of ribs, that of the boy about 1 inch. Livers slightly, if any, enlarged. The spleens of both cases are firm, but not hard to the touch.

Examination of the blood from girl shows the following (Dr. L. B. Goldhorn):—

"Many nucleated reds, half of which are megaloblastic in type. Marked poikilocytosis. Marked lack of hemoglobin. No malaria. In detail: Red cells, 2,200,000. Color index, 0.5. Hemoglobin, 22 per cent. Leukocytes, 18,700.

Differential count:—

Polymorphonuclear	32.1	per cent.
Lymphocytes	49.8	" "
Transitionals	15.1	" "
Eosinophiles	1.0	" "
Basophiles	0.8	" "
Myelocytes	1.2	" "

The specimen from boy shows practically the same, with less anemia and less leukocytosis.

CASE III.—Boy, two years of age, the youngest of three children, others living and well. Parents healthy, no miscarriages, or other specific history. This baby has been breast fed entirely, although the mother has menstruated for the past six months. First tooth at twelve months. A great deal of bowel trouble, especially each summer. The child has been sickly and weak from birth and has never walked.

On examination, extremely rachitic and emaciated. Six teeth, marked rachitic rosary and epiphyses greatly enlarged. Spleen extends to 2 inches below costal arch, fairly hard to the touch. Liver is enlarged to within a finger's breadth of umbilical level.

Examination of the blood by Dr. Goldhorn shows:—"A very grave secondary anemia. Very marked variation in size of red cells, moderate amount of poikilocytosis. Many normoblasts, a few megaloblasts. Karyokinesis is present. Red cells, 3,200,000. Color index, 0.8. Hemoglobin, 52 per cent. Leukocytes, 18,200. No malaria.

Differential count:—

Polymorphonuclear	42.2	per cent.
Lymphocytes	42.5	" "
Mono- and transitionals.....	9.2	" "
Eosinophiles	5.1	" "
Basophiles	1.0	" "
Myelocytes	0.0	" "

These cases of enlarged spleens and anemia come to us even in private practice with this condition already established, and we do not know when or how it began and can only surmise the probable cause. In a few we get a definite history of malaria, but we do not anticipate such a result from malaria; nor in a very large majority of malarial cases do we get it. Who would be justified in saying that infants with healthy brothers and sisters,

no family history of syphilis, and no other evidences of specific disease, have congenital syphilis which has caused the present condition?

As to diet as an etiological factor, we are just as indefinite. Take these cases for example:—The first, the boy presented at the last meeting, food and hygiene the best obtainable; the twins here tonight, breast milk and fairly rational modification of cow's milk, raw; out of doors a great deal; and finally, the marantic, pot-bellied, rachitic boy, who has had only his mother's breast.

If any of us in future should have the opportunity of keeping records of the blood in a similar case, together with a full clinical history, food, digestion, hygiene, etc., from birth, then I believe we could add most important information as to the etiology of this condition.

It is possible that the blood of these cases showed at birth great abnormality, and could we have known it we should have been able to anticipate, and perhaps prevent, some of these distressing results; for while the twins will get well, the others will probably die. And further, we should be in better position to conclude that this condition depends primarily upon a congenital abnormality of the blood-forming organs of the child or an abnormal nutrition of the fetus on the part of the mother. We could at least be more certain of its embryologic origin.

DR. CHARLES HERRMAN said that a few months ago Dr. Long had shown cases of this character, infantile splenic anemia, and in the discussion the question came up as to whether some of them did not represent cases of congenital anomaly of the blood-forming organs. In the case presented the mother stated that the child was pale from birth; therefore, congenital. There was no etiological factor acting since birth. There was no history of congenital syphilis, or intestinal derangement, and the hygienic surroundings and diet were not bad. Dr. Herrman said he had seen three sets of twins with this condition and at the time the cases were presented for discussion he mentioned that Hutchison explained the condition in this way, viz.: The fetus derived from the mother, through the placental circulation, a certain amount of iron which was stored up in the liver. When there were two children the amount of iron might be insufficient for both. The cases presented by Dr. Long seemed to support the theory of the congenital anomaly of the blood-forming organs.

A CASE OF CONGENITAL SYPHILIS.

DR. CHARLES HERRMAN presented this case, an infant of nine weeks. The parents were healthy and were cousins. The child presented was their second. Their first child died when eleven days old and, according to the mother, the condition of this child was similar to the case presented. There had been no miscarriages. Labor was normal. The child was breast fed every two hours. At birth there was noted a marked edema, especially of the dorsum of the feet and hands. The child was first seen by him on November 21st. At that time the child was small, poorly nourished, and weighed four pounds and four ounces. Temperature was 97.4° F. The skin was dry, somewhat brownish, and there was also eczema seborrhoicum. There were excoriations on the buttocks. The edema was especially marked on the dorsum of the feet and hands, less marked on the legs, scrotum and penis. There was a slight rhinitis. There was a systolic murmur over the precordium, but no enlargement of the heart. A specimen of urine could not be obtained. The liver and spleen were somewhat enlarged. The mother was given bichlorid of mercury with the hope that the child could get it through the breast and also to improve the condition of the milk. The child did improve and now weighed five pounds and five ounces and the edema was less marked. Without a urinary examination one could not exclude kidney lesions, but so far as he was able to judge there was no lesion of the kidney. The heart murmur was in all probability a congenital one. The probable diagnosis seemed to be syphilis and, therefore, the child would be placed on direct antisyphilitic treatment.

DR. HENRY E. HALE said that he was very glad to have the point brought out that many cases of congenital syphilis, untreated, did very badly. He said that very morning he had seen a moribund baby, moribund probably because of a delay of about twenty-five days in starting treatment after the diagnosis was made. This child was seen first on November 20, 1906, at two months of age, with fairly classical symptoms of congenital syphilis. The buttocks, adjacent portions of the thighs and scrotum were the seat of a marked intertrigo. On this background were seven or eight slightly raised grayish spots, irregular in outline, about the size of a ten-cent piece.

The mother was told the seriousness of the case and that the treatment would have to be continued for over a year. In spite of this, she did not bring the child back for over three weeks and then not until she was sent for. During this time she had not even administered the medicine given her at the time of her first visit, as she had gone to a "private doctor," who had not examined the baby, yet told her that there was nothing seriously wrong with him, and accordingly advised only the use of a dusting powder to the red areas.

The lapse of the twenty-five days mentioned, without treatment, reduced the child to a marantic condition, with fearful excoriation of the upper lip, loosened nails, scaling palms and soles, fissures of the mouth and anus, cracks in the hands, and deep bleeding ulcers had replaced the grayish areas about the buttocks. The child was breast fed, his mother having an abundance of milk for him. Under appropriate treatment the lesions at once began to improve and when seen that morning the fissures and excoriations were cured, and the ulcers very much better, yet there was no gain in weight; in fact, there was a steady loss, and death was only a few hours away.

URINAL FOR INFANTS.

DR. HENRY DWIGHT CHAPIN presented an infant's urinal which made the collection of urine easy. Because of some slight leakage the instrument was not adapted to metabolism observations. The instrument, however, was suitable for the purpose intended, *i.e.*, the collection of urine in infants for ordinary examination.

PYELITIS IN INFANCY AND CHILDHOOD, WITH REMARKS ON THE URINE.

DR. LOUIS FISCHER read this paper, which will be found on page 445.

DR. HENRY ILLOWAY said that the laboratory reports of the examinations of the urine of the cases reported in the paper show the presence of pus, of hyaline casts, of epithelia and of epithelial casts; and still the author entitles them cases of pyelitis. It is true that others also make use of this term when speaking or writing of renal diseases, as he had seen in *THE ARCHIVES OF PEDIATRICS*

and in other journals. He should like to know how they differentiated pyelitis from acute or chronic nephritis. If it be merely to use a term that means disease of the kidney or kidneys in general, why say pyelitis, which refers to an affection of a certain distinct part; why not nephritis, which may refer to any part of the organ? So far as he was concerned, he should, upon the laboratory reports, regard the cases referred to therein as cases of acute or subacute catarrhal nephritis, rather than of pyelitis, for which latter no evidence is adduced either by the author or by the reports.

DR. L. E. LA FÉTRA showed a chart with an intermittent curve of temperature lasting for five weeks which could be considered in connection with Dr. Fischer's paper. A baby of fourteen months was seen after one week's illness. The real course of the disease was five weeks. Examination of the urine revealed a comparatively small amount of pus by volume. In cases of pyelitis, the pus could usually be measured by volume. There were very few casts. This was really the pathological distinction between nephritis and pyelitis. Usually there were wide excursions of temperature up and down, the daily range extending over 3 degrees or even more. Quinin or other drugs do not relieve it unless they cure the pyelitis. Urotropin is of course the best single remedy. The colon bacillus was usually found in these cases.

DR. CHARLES G. KERLEY said that his cases numbered 5, and they differed from those reported by Dr. Fischer, probably because they were young children. All were under eighteen months of age, and all were girls. In all there was marked severity of onset, in 3 by chills. Two of the 3 had distinct chills on different days before the diagnosis was made. In all of the cases the excursions of the temperature were wide: from normal in the morning to high in the afternoon, or *vice versa*, and with variations of from 3 to 5 degrees. In the first 2 cases the diagnosis was made simply by an examination of the urine; nothing else could be discovered to account for the illness. In all cases the colon bacillus was found.

DR. GEORGE D. SCOTT asked if there were small round or coccoid cells present in the urine. He had seen many cases during the last few years.

DR. MATTHIAS NICOLL, JR., said that in looking over the microscopic reports which accompanied the histories of Dr. Fischer's cases he said he was puzzled, taking into consideration the lack of clinical symptoms, to know upon what part of the findings the diagnosis was based. He asked if there was anything in the findings, or elements in the microscopic findings, which could not be accounted for in lesions lower down, in the bladder or in the ureters.

DR. L. EMMETT HOLT said that in the first case he had seen the chills were a striking symptom. They recurred at frequent intervals, occasionally two being seen in a day. The teeth would chatter, the child would become blue, and the temperature rapidly rise from normal to 105° or 106° F. This child was only seven months old. This case was reported in one of the first papers he wrote on this subject years ago. He had not seen this symptom often in other cases.

The quantity of pus present was larger than he had ever observed since. In an ordinary-sized test tube the deposit of pus after standing was frequently one-sixth the volume of urine. He was inclined to believe that chills were exceptional, but that they sometimes occurred with marked severity.

DR. LOUIS FISCHER said his main reason for bringing this subject again before the Section was that he had met with several cases showing an *afebrile type*. In these cases routine method of examination of the urine brought to light the true diagnosis of pyelitis. Every specimen of the urine in cases here reported was examined by Dr. Sondern. The urine by inspection showed a considerable quantity of pus, in 1 case about a half ounce.

While a case showing fever, and having frequent and painful micturition, would lead to a suspicion of pyelitis, the typical cases should not be forgotten. In one febrile case the fever was of a distinct intermittent type, so that the attending physician treated the case for malaria. One case, seen also by Dr. Holt, suffered from coryza, for the relief of which Dr. Fischer was called. Routine examination of urine showed pus and blood, and in this case no fever was present. The child had been in the street daily. No evidence of urinary or kidney difficulty was suspected by the mother or nurse in charge of this case.

In regard to Dr. La Fétra's case, it corresponded with the malarial form of fever reported. Regarding the point brought

out by Dr. Kerley, he had never seen rigors in young infants nor a distinct chill in pyelitis.

REPORT OF THREE EPIDEMICS OF MEASLES, WITH PARTICULAR
REFERENCE TO KOPLIK'S SYMPTOM AND ITS RELATION
TO THE RASH AND THE INITIAL FEVER.

DR. CHARLES J. DILLON read this paper, and presented statistics compiled from the records of three epidemics of measles in institutions for children. The diagnostic value of this symptom seemed to be quite generally conceded by the pediatricists of America and England, but not by any means so well credited by the French and German diagnosticians. To give an idea of the confusion which existed regarding the value of Koplik's symptom, he briefly considered recent observations of a few prominent investigators:

At the New York Foundling Hospital in the spring and summer of 1905 a small epidemic of about 60 cases, and an epidemic of about 200 cases in the spring of 1906, furnished the bulk of the material for this study. An additional opportunity for observation was afforded by an epidemic of about 85 cases in another institution for older children ranging from five to fourteen years, during the recent summer.

In summarizing, Dr. Dillon said (1) from these observations it would seem that Koplik's symptom was a constant, definite, early diagnostic sign of measles, of greater diagnostic value when present than even the rash. The constancy of the symptom was indicated by the fact that in 221 cases observed from the period of incubation well into convalescence it was definitely absent only twice. (2) Koplik's spots sometimes disappear before there was any sign of a skin eruption, and frequently before the rash had fully bloomed. (3) Cases seen in the earliest stages and presenting few Koplik's as yet were known to have infected exposed children, and for this reason the early detection of the spots could hardly be expected to prove a prophylactic measure of any great value. (4) Koplik's symptom was usually, if not always, preceded by a febrile movement and the thermometer would seem to be the best aid to early diagnosis when dealing with an epidemic in an institution.

At the election for the ensuing year the following officers were chosen: Chairman, Dr. Godfrey Roger Pisek; secretary, Dr. Eli Long.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGAR.

DR. CHAS. TOWNSHEND DADE.

DR. ALFRED F. HESS.

DR. A. W. BINGHAM.

DR. HENRY HEIMAN.

DR. M. NICOLL, JR.

DR. G. R. PISEK.

PATHOLOGY.

Simpson, J. W.: The Thyroid Gland in Relation to Marasmus. (*Scottish Medical and Surgical Journal*, December, 1906, p. 504.)

The writer suggests, from a series of observations on marantic children, that the atrophic condition of the thyroid gland regularly found in such cases may be a cause, rather than an effect, of the various hygienic and other factors which lead to marasmus. A number of these cases, which were making little or no favorable progress under routine treatment, were given $\frac{1}{3}$ to $\frac{1}{2}$ grain thyroid extract tablets each day, with good results.

M. NICOLL, JR.

Bosquet and Gaujoux: A Case of a Tumor of the Cerebellum with Autopsy in an Infant. (*Annales de Médecine et Chirurgie Infantiles*, January, 1907.)

This is an extended report of a case of glioma of the left lobe of the cerebellum of a child of thirteen years. The center of the tumor had undergone a gelatinous degeneration.

From the history of the case it appears that the first brain symptoms appeared five years before the death of the patient, and about six months later blindness developed. The child was under the observation of the writers for the last five months of her life, and the development of the various symptoms is recorded: headache, convulsions, pain in the limbs, loss of reflexes, sugar in the urine, nystagmus, etc.

L. C. AGAR.

Froelich, M.: A Case of Congenital Cranial Tumor. (*Annales de Médecine et Chirurgie Infantiles*, November 15, 1906, p. 749.)

This is the report of the removal of a cavernous angioma the size of a small orange from the left parietal region of a girl of two years. It was situated above and behind the ear. At birth

the tumor was about the size of a large pea, purple in color. It became tense when the infant cried. It grew very slowly for a year, when the child had an attack of pertussis. After that the growth was rapid. The growth was readily removed and on section it was found to consist of a series of small cysts, some of them containing yellow fluid, some black blood. The tumor also contained some cartilage.

The author reviews at some length the list of tumors that might be found at birth in this location, and describes the process by which an angionia becomes converted into a cystic tumor.

L. C. AGER.

Schmorl, G.: The Pathogenesis of the Anatomical Changes in the Bones in Barlow's Disease. (*Jahrbuch für Kinderhk.*, January 9, 1907, p. 50.)

The author denies the assertion recently made by Looser, that the pathological changes in the bone-marrow in Barlow's disease are due to hemorrhages in the medulla of the bones. In his microscopical specimens he found these changes without any evidence of hemorrhage. Schmorl cannot accept Ziegler's view of the nature of the disease as a primary affection of the bone-marrow. The changes in the bone-marrow are not sufficiently extensive in most cases to produce the marked symptoms of the disease, such as anemia, hemorrhage, etc. He thinks that the subperiosteal hemorrhages, the changes in the bone-marrow, and the atrophy of the bones, are independent of each other, and probably due to one primary cause, the nature of which is at present unknown.

HENRY HEIMAN.

Harbitz, Francis: Examination as to the Frequency, Localization and Extent of Tuberculosis, Especially in regard to the Involvement of the Lymph Glands and Its Occurrence in Childhood. (*Internationales Centralblatt für Tuberkulose-Literatur*, No. 2, 1906, p. 40.)

Among 275 autopsies on children, tuberculosis was found in 42.5 per cent.; in 9.8 per cent. it was latent. Of the 117 cases of tuberculosis 23 per cent. were latent. Latent tuberculosis was found in the following order of frequency: Bronchial glands, cervical glands, tonsils, mesenteric glands. In 18 cases, glands

which were macroscopically negative showed virulent tubercle bacilli as tested by inoculation; this includes 13 cervical glands, 3 mesenteric glands, and two cases where both were affected. The latency cannot be of long duration, as older children rarely show signs of it.

Among 261 stillborn children, tuberculosis was never found. In children the glands are generally primarily affected, and the lungs secondarily, either by the lymph or blood path, or by direct infection. Harbitz believes infection through the pharynx to be of more importance than that through the intestinal canal. The remainder of the article gives the result of 558 autopsies on adults, in which 69.2 per cent. showed tuberculosis.

ALFRED F. HESS.

MEDICINE.

Schlossmann, Arthur: The Chemical Reaction of Infants' Stools, and Its Clinical Significance. (*Centralblatt für Kinderheilkunde*, July, 1906, p. 237.)

The reaction of infants' stools is not dependent on the kind of milk, whether human or not, but on the relation between the fat and proteid. The stool of a child that is thriving on a milk diet will usually be found acid, if the fat is greatly in excess of the proteid, and, conversely, if the percentage of fat approaches to that of their proteid the reaction will be alkaline. Various factors serve to modify this rule, but an examination of the reaction of the stools may furnish a warning of approaching trouble, or point to the advisability of modifying the diet.

M. NICOLL, JR.

Comby, J.: Enteritis and Appendicitis in Infants. (*La Pathologie Infantile*, August 15, 1906, p. 205.)

Enterocolitis, especially of the membranous type, is often the forerunner of an appendicitis. It, in fact, should be regarded as an extension of the disease to the mucous membrane and follicles of the appendix.

Enterocolitis and appendicitis are frequently preceded by attacks of rhinopharyngitis and adenoiditis, apparently caused by direct extension through swallowing infected material.

M. NICOLL, JR.

Dunn, Charles Hunter: The Clinical Aspects of Rheumatic Fever in Childhood. (*The Journal of the American Medical Association*, February 9, 1907, p. 493.)

Based on a study of some 300 clinical cases, Dunn reviews the literature on the subject as to the etiology of the disease, and then points out the peculiarities of the disease in children as he found them clinically. This he does because the standard textbooks do not fully appreciate these peculiarities.

To Poynton and Paine he attributes the most important contributions to the etiology of the disease, and concludes that at present it seems advisable to accept the micrococcus rheumaticus, not as the absolutely proven specific cause, but as the probable specific cause of rheumatic fever.

The following characteristics of the disease are pointed out:—

(1) The comparative mildness of the articular manifestations.

(2) The relative frequency of cardiac manifestations.

(3) The large majority with cardiac manifestations only.

(4) The frequent occurrence of endocarditis or pericarditis as a primary manifestation.

(5) Cardiac manifestations are the most severe, even greater than the acute arthritis.

(6) The marked tendency to recurrent attacks, with varying manifestations.

(7) The principal cause of the development of cardiac symptoms, so-called "broken compensation," is not overexertion, but a fresh infection, the heart being weakened by an accompanying myocarditis.

Dunn emphasizes the strong relationship of rheumatism to chorea, sore throat and cardiac processes.

As regards the prognosis he points out that in early life the chances may be as high as one in five. Cardiac complications are more frequent than in adults.

G. R. PISEK.

Fox, T. Colcott: A Case of Eczema Seborrhoeicum with Spines. (*British Journal of Dermatology*, September, 1906, p. 317.)

Dr. Fox gives the clinical notes of the case occurring in a boy aged eleven years, received at the Westminster Hospital. The

scalp was encased in a sheet of dry, white, coherent scales, and this condition had existed for more or less years. The child had pediculi capitis. Behind the ears were diffuse, red, exuding areas; the face free. On the trunk almost every follicle was slightly congested; from many of the follicles issued spines of about $\frac{1}{16}$ inch in length. Spines horny and hard. The projecting follicles arranged in groups. Limbs affected as much as trunk. The child was treated with daily washings with creosote soap, followed by a warm bath, after which inunctions of equal parts of my. acid borici, my. sulph. and my. acid salicyl. A rapid recovery was made under this treatment. The article is accompanied by a very good plate.

CHARLES TOWNSHEND DADE.

Fox, T. Colcott: A Case of Granulosis Rubri Nasi.
(*British Journal of Dermatology*, September, 1906, p. 320.)

A healthy-looking, well-built boy, aged nine years, presented on the end of his nose an eruption which had attracted attention for two or three months. On the end of the nose was a number of isolated, red, semitranslucent, rather deep-seated, shortly-projecting nodules the size of a pin's head. These nodules displayed a deep apple-jelly-like infiltration when pressed on by a glass, and were indistinguishable from the classical nodules of lupus vulgaris. So strong was this resemblance that the writer says he at first made the diagnosis of lupus. Later his attention was called to some half dozen small vesicles, or clear cysts, which had arisen on the affected area, and a further study of the case convinced him of its real nature. Free sweating of the end of the nose was several times noted. Conspicuous sweating may or may not be present when the case comes under observation. Accompanying the article is a very excellent plate.

CHARLES TOWNSHEND DADE.

Neumann, H.: Impure Heart Sounds in Children.
(*Münchener Med. Woch.*, No. 8, 1907, p. 306.)

The author says that this subject is not considered in the pediatric literature, but that he has frequently found an impurity or reduplication of the first sound in children between two and eleven years of age. Examination of many cases in private

practice has shown that the onset of this symptom is sudden, and that it continues throughout life. Measles and whooping-cough especially, or indeed any affection of the respiratory tract, from the nose to the lungs, may give rise to this disturbance; it may follow tonsillitis or even repeated "colds." A family disposition exists. The prognosis is not of the best, as these children are not as strong as others, nor do they live as long. Neumann believes the cause not to be endocarditis, but rather a disturbance of the nerve muscle apparatus of the heart.

ALFRED F. HESS.

SURGERY.

Jopson, John H.: Empyema in Children. (*University of Pennsylvania Medical Bulletin*, December, 1906, p. 263.)

In a series of 41 cases of empyema in children operated upon at the Philadelphia Children's Hospital, there were 58 per cent. of female children and 42 per cent. of male children, ranging between the ages of ten months and thirteen years. In a large majority of the cases there was a history of pneumonia preceding the development of the empyema. Aspiration has no place as a curative measure in the treatment of empyema, and although intercostal section is sometimes a highly successful operation, resection has certain unquestioned advantages. The steps of the operation consist in the administration of ether after all preparations for the operation and sterilization of the chest wall have been completed. It is a rule always to aspirate first with the hypodermic needle at the site of our proposed excision to demonstrate the presence of pus. An incision is made posterior to the postaxillary line, over the eighth or ninth rib, in unencysted collections; where the collection is encysted, the rib corresponding to its lower limit is chosen. In small children about an inch of the rib is removed. When pus is encountered the patient is turned to the affected side to facilitate its escape. The cavity is explored with the finger and two large drainage tubes inserted into the most dependent portion of the cavity, and if there is much oozing of blood a wick of gauze is packed into the cavity. No irrigation is used during or after operation, except in cases of putrid empyema, and here only may it be advisable to use mild

irrigation for only a few days. The dressings when saturated are changed usually twice in the first twenty-four hours, and after that at daily intervals, using all antiseptic precautions. The temperature usually falls to normal in three or four days if the drainage is efficient and no complications are present. The common complications during the postoperative period were pneumonia, persistent or reawakened, gastroenteritis, and a condition resembling marasmus, but really a form of septic poisoning. Tubular drainage is maintained until the discharge has diminished sufficiently to drain by a gauze wick. One tube is first removed and the other gradually shortened and finally dispensed with. This can sometimes be done in ten days, but the amount of discharge is the guide. Closure of the sinus takes place more rapidly after rib resection than after intercostal incision. Very young children with very high fevers, dyspnea and rapid pulse are much more unfavorable cases than older children with long-standing collections. Secondary operations were resorted to in 5 cases.

HENRY HEIMAN.

Cumston, Charles Greene: The Surgical Aspects of Bronchiectasis, Particularly in Children and Young Adults. (*The Dublin Journal of Medical Science*, February, 1907, p. 84.)

Cumston points out that the commencement of bronchiectasis usually eludes the attention of the physician, and that it is almost impossible to make the diagnosis from one examination or at long intervals. Therefore in children it is often overlooked. Of recent years the lung has been placed in the field of the surgeon. The main diagnostic aids are the shortness of breath on exertion, the sputum, and the attacks of expectoration on sudden change of position. The X-ray is of utmost importance in verifying the diagnosis. The signs on percussion and auscultation found in adults cannot be depended upon for aid in children. Curving of the finger nails and drumstick fingers are frequently found however.

The operation consists in mobilizing the structures surrounding the lung, by extensive resection of the ribs and drainage of the cavities. The results, Cumston says, have been satisfactory on the whole. The author reports his personal experience with 2 cases with excellent results.

G. R. PISEK.

HYGIENE AND THERAPEUTICS.

Loring, Robert G.: A Report on the Examination of the Eyes of 420 School Children in the Town of Brookline. (*Boston Medical and Surgical Journal*, December 13, 1906, p. 707.)

In the examination of the eyes of 420 school children, in a school in Brookline, Mass., Loring found the eyes free from the chronic inflammatory diseases, such as conjunctivitis and blepharitis, which are so commonly present in our large city schools filled with children from the tenement districts where the hygienic conditions are bad. There was no trachoma, no phlyctenular disease, and almost no follicular catarrh, and only one case of keratitis. One hundred and sixty-seven out of the 420 children had perfect vision; 155 only slightly imperfect eyes; while those with really defective sight or troublesome symptoms numbered 98, or 23 per cent. In regard to the relation between refractive errors in children and their standing in scholarship, Loring found the children were marked with one of five grades: excellent, good, fair, unsatisfactory and poor. Out of all the children, 86 reached the grade of excellent, and 43, or one-half, belonged to the class with perfect eyes, while those with defective vision furnished only 12. These figures strongly suggest that refractive errors and the latent symptoms of eye strain do account for a large part of poor scholarship, and that a large number of poor scholars are probably suffering from defective eyes, though often having good vision. In comparing the results from the lowest to the highest grades, the proportion of normal children gradually fell off. With advancing education the proportion of normal eyes steadily diminishes and an increasing number of nearsighted and astigmatic children are found.

HENRY HEIMAN.

Devraigne, Louis: The Diagnostic, Prognostic and Therapeutic Value of Lumbar Puncture in the Newborn. (*La Pathologie Infantile*, July 15, 1906, p. 176.)

When a newborn babe is cyanosed, has convulsions, contractions, a temperature, and passes into coma, instead of guessing at the cause and applying heat, practicing insufflation and the like, it is advisable to make a lumbar puncture by the usual method. First, in order to determine the presence or absence of subdural hemorrhage shown by the blood-tinted cephalo-rachidian fluid, and, second, as a therapeutic measure. If, after such a puncture

and the withdrawal of 3 to 10 c.c. of fluid, improvement takes place the operation should be repeated with every hope of effecting a recovery. If no such fluid is found by the needle, it is to be inferred that the hemorrhage, if present, is not in the sub-arachnoid space, or that the symptoms are due to other causes, in which case the prognosis should be regarded as unfavorable.

M. NICOLL, JR.

Kerley, Charles Gilmour: Prevention of the Acute Intestinal Diseases of Summer. (*British Medical Journal*, October 13, 1906, p. 927.)

Potent etiological factors are unfavorable climate conditions and unfavorable environment, neither of which can be changed to any great extent.

Other factors are: First, a disordered gastrointestinal tract; second, infected food; third, faulty feeding methods; fourth, an absence of appreciation on the part of the parents and physicians that an attack of diarrhea or vomiting, or even a green, undigested stool occurring in an infant under eighteen months of age during the hot summer, is to be looked upon as a serious matter requiring prompt relief. With milk, the most readily infected of all nutritional substances, as the chief article of diet, it may be safely assumed that few infants pass through the heated term without having been subjected repeatedly to infection and bacteria sufficient to produce grave illness. The so-called market milks supply the nutrition for an immense majority of the infants of the poorer classes; this milk is not a safe food, and it is among these infants that the large death rate occurs. Mothers must be taught how to care for their children all the year around. They should be taught the value of fresh air, the use of boiled water as a drink, and the benefit of frequent spongings on hot days, how to care for the bottle and the milk, also how to prepare special articles of diet when these are needed.

Municipalities must be educated to know their part as factors in the summer mortality. The farmers must be educated how to produce safe milk, and the consumers must be educated to appreciate its value and pay for it.

The physicians must be educated so as to be able to teach the mother how to take suitable care of the child during the entire year.

A. W. BINGHAM.

ARCHIVES OF PEDIATRICS

VOL. XXIV.]

JULY, 1907.

[No. 7.]

Original Communications.

A STUDY OF THE EARLY CONDITIONS OF OSTEO-MYELITIS IN YOUNG CHILDREN BY THE RÖNTGEN RAY.*

BY THOMAS MORGAN ROTCH, M.D.,

Professor of Pediatrics, Harvard University, Boston.

AND

ARIAL WELLINGTON GEORGE, M.D.,

Röntgenologist to the Children's Hospital, Boston; Röntgenologist
and Assistant in Anatomy, Harvard Medical School.

Since the Röntgen ray has been brought into more general use and since a special study has been made of the different infections of the bones, great advances have followed our knowledge of the living pathology of osteomyelitis. In this way the primary pathologic conditions in the bones of early life have become more prominent, as they show at that period the actual pathology, while the postmortem in many cases shows only terminal results. These terminal results may sometimes be characteristic of the special infection, but more often may represent conditions which are the result of a number of entirely different infectious organisms.

Osteomyelitis is in certain respects the most important disease of the bones which occurs in early life. This is true on account of the tremendous destruction of bone, either terminating in death or in various degrees of deformities which may be permanent. The rapidity of the onset and the resulting rapid destruction of bone give osteomyelitis a place in diseases of the bone which appendicitis holds in diseases of the abdomen. In cases of appendicitis, delay in operation may mean death. In osteomyelitis, delay in diagnosis and operative treatment may mean not only death, but resulting deformities which cannot be rectified and in some cases mean more than death.

It is, therefore, very important that an early diagnosis should

* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 8, 1907.

be made and that operative treatment, if indicated, should be decided upon at once. To accomplish this early diagnosis, the Röntgen ray is of inestimable value, for at times it tells us what the clinical examination fails to.

Osteomyelitis is a general disease so far as its etiology is concerned, but in many cases it can only be diagnosticated surely by the Röntgen method. It is caused by a number of organisms; mostly by the staphylococcus in the chronic cases of low grade, and in rapidly septic cases the streptococcus is most commonly causative. In certain cases the pneumococcus occurs and produces a fairly chronic condition, and finally the typhoid bacillus may cause either an acute or chronic process.

We shall not speak here of the relation of the capsule to the cortex and cartilage, although this plays a great rôle in the determination of whether the joint is infected or not and whether the danger is greater or less. We shall merely enunciate the fact that the Röntgen ray should be used at once during the earliest period of the symptoms, and that we should not be led astray in our diagnosis by thinking that the case may be one of rheumatism or scorbutus, or even of tuberculosis.

The first condition—rheumatism—causes more confusion in the mind of the general physician than can possibly any other. For this reason the organism of osteomyelitis has an opportunity thoroughly to infect the bone and often to such an extent that operative treatment becomes of little avail. This is especially the case in very young children, under two years of age, where the percentage of cases caused by infection of the epiphyses is very high.

As in other severe diseases of the bone, it is difficult to make a definite diagnosis of osteomyelitis unless examined by the Röntgen method. When the ray is used, however, the difficulty is very greatly lessened. In early infancy scorbutus, and somewhat later rheumatism, are specially thought of in connection with the diagnosis, and the clinical diagnosis is thus rendered very obscure.

Infectious osteomyelitis may be single or multiple in its first appearance and in its course subacute or chronic.

Aside from the very marked clinical signs the infection of the epiphyses presents a characteristic picture. The involvement of any of the bones may occur, but the knee is the most common seat of the infection. The tissues usually show swelling and

thickening, the epiphyseal line is thickened and filled in, and the shadow surrounding the epiphysis and diaphysis is dense.

The infection commonly attacks the long bones, and it is usually the extremities of the bones which are involved. According to the site of the infection and the tissues involved, the infection may be of the periosteum or of the marrow. When the infec-

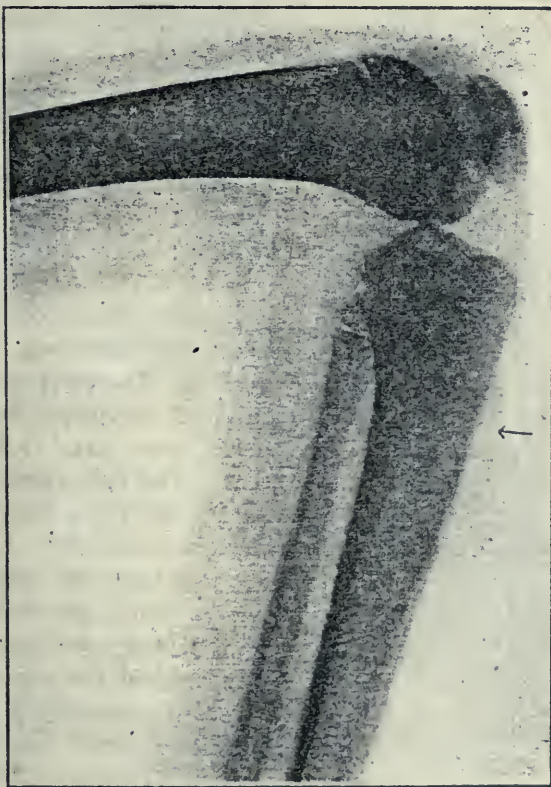


PLATE I. CASE I.

tion is seen early, as by the aid of the Röntgen method, the principal pathological change is found in the periosteum. This change consists of thickening and bulging of the periosteum, with the line of the periosteum less distinctly seen. Again, the periosteum may be thickened and ragged, exposing the cortex.

When the infection is of the marrow, the radiograph shows very early in the process the infected area as one or more definite shadows, varying in size from a pin-head to several times that

size. There is found an increased area of radiobility in which the bone structure is being destroyed and absorption of the lime salts is apparently taking place. In the subacute and chronic stages of osteomyelitis the bone structure shows less distinctly and is accompanied by atrophy below the point of infection. This is not

particularly marked in size, but in quality, and may determine the amount of proliferation of the periosteum. The definite areas of exfoliated bone under these circumstances are easily demonstrated.

The accompanying radiographs illustrate what has just been said:—

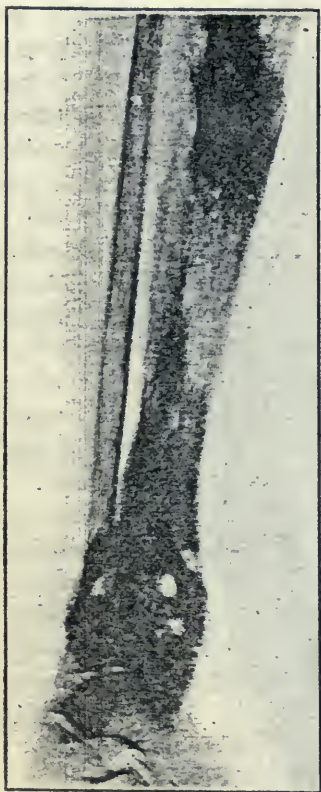


PLATE II. CASE I.

PLATE I.—CASE I.—Nine years old. Shows one of the earliest manifestations of osteomyelitis. The child was kicked on the tibia, the injury having taken place two days before being seen. The radiograph was taken on the third day and showed an increased radiobility of bone about one inch below the epiphyseal line of the tibia, and below this a slightly boggy periosteum running down almost the whole length of the tibia, especially in front, and showing evidently an exudation of fluid under the periosteum, proved later by operation not to be blood.

The clinical symptoms were extreme pain, swelling, no fluctuation or redness, tenderness, and varying temperature.

PLATE II.—CASE I.—Plate II. shows the same case. Owing to delay in making a correct diagnosis, operation was postponed until infection had taken place, and the process went on to such an extent that the whole bone was involved. The plate shows proliferation of the periosteum, with formation of sequestra.

This case was evidently one of simple trauma in the beginning, and if it had been recognized that an early infection had taken place operative treatment would have been very simple and

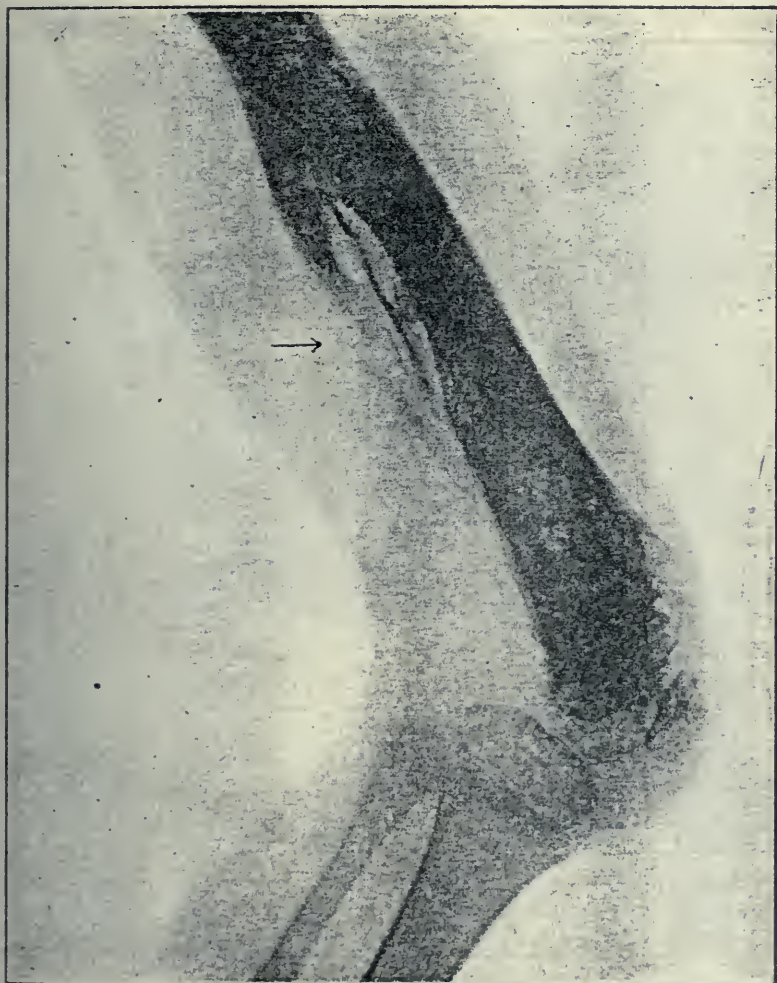


PLATE III. CASE 2.

would have preserved the leg from the extensive lesions shown in the radiograph.

PLATE III.—CASE 2.—Ten years old. Entered the hospital for rheumatism. Symptoms were referred to knee joint, where

there was swelling and tenderness, but nothing localized in the lower part of the femur. The radiograph showed increased radiobility of the diaphysis of the femur, with proliferation of the periosteum. Operation was delayed too long and the infection went

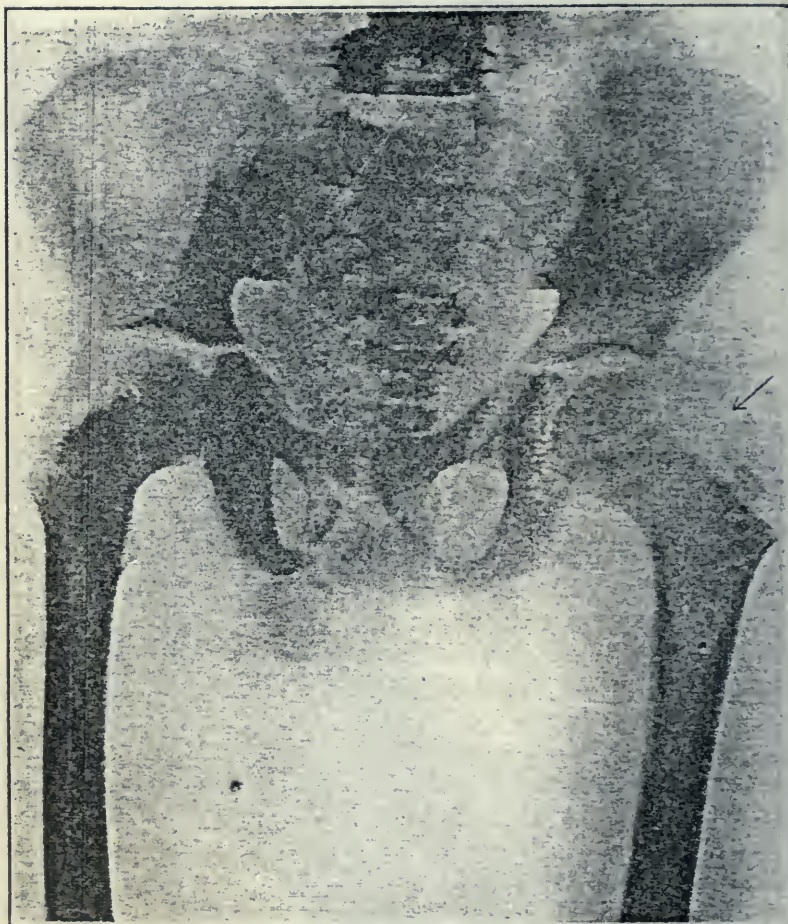


PLATE IV. CASE 3.

on so far that the disease lasted for over a year. Several operations had to be performed for the removal of sequestra, and although the child finally recovered, it was left with irreparable deformity.

Plate III. shows the final results in this case, namely, sequestra, which had to be removed, leaving a deformity.

PLATE IV.—CASE 3.—Five years old. There was a history of swelling, with slight limitation of motion and pain about the hip. It was sent to the hospital with a diagnosis of tuberculosis of the hip. The radiograph showed an infiltration, with abscess

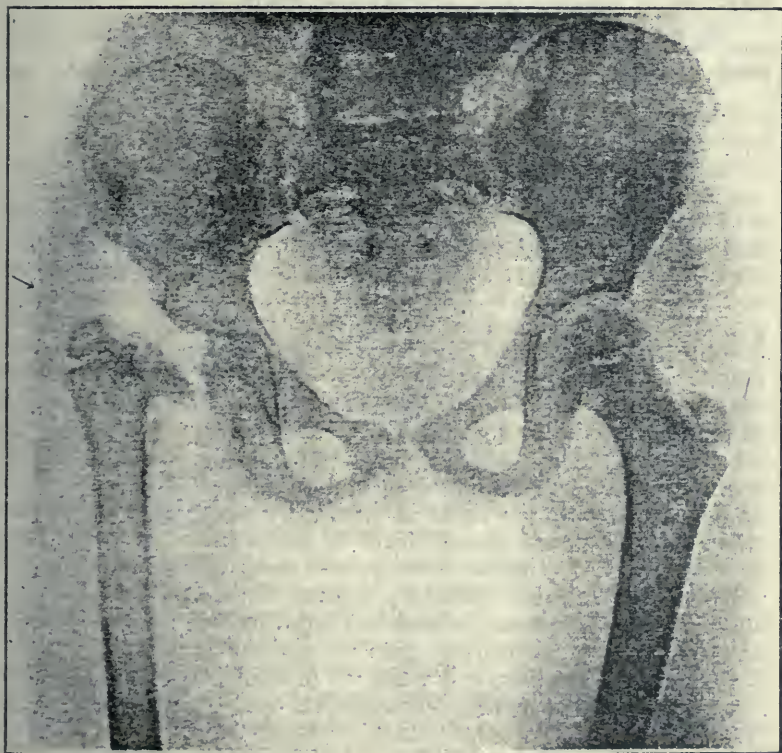


PLATE V. CASE 4.

formation resulting from infection of the neck of the femur, with proliferation of the periosteum about midway between the greater and lesser trochanter and epiphyseal line. There was here also an area of increased radiobility.

PLATE V.—CASE 4.—Twelve years old. The plate of this case shows the permanent results of acute osteomyelitis of the femur. It was treated for tuberculosis of the hip, and all of the

destruction took place within two or three months. An early operation would have obviated this result.

For purposes of differential diagnosis, the process was aspirated and on examination showed a staphylococcus infection.

In all cases where the diagnosis is not clear, we should never disregard the fact that we have in the Röntgen method a means by which we can clearly understand the case and know at a very early period whether operation is indicated or not.

All the above radiographs were taken at the Children's Hospital, Boston.

DISCUSSION.

DR. ADAMS.—I think Dr. Rotch's paper illustrates the fact that many times physicians are as competent to make these diagnoses as the surgeons and laboratory men. Too often we get panicky and turn over a case to the surgeon without thoroughly investigating it from the medical standpoint. In many of these cases, it seems to me, it would have been better if the physician had insisted upon having every means of diagnosis employed rather than accepting the dictum of the surgeon. We know that too often the nature of the disease is accepted as determined by laboratory methods, thereby completely cutting out clinical observation. While I do not wish in any manner to be understood as detracting from the value of laboratory methods, still I believe that clinical methods should never be lost sight of in formulating a diagnosis. We know how prone many physicians are, the moment the slightest difficulty arises, to accept the diagnosis made by the laboratory, instead of interpreting the report from the laboratory in its bearing upon the clinical facts.

These cases illustrate a point of primary importance to us—the value of investigating for ourselves with every means at our command. On the other hand, it would seem to be rather a severe criticism on somebody if these cases represent the work of intelligent practitioners. Some of it is certainly reprehensible. That a man should accept a wrong diagnosis in a case of fracture without using the means which is almost certain to detect it, or exclude it, is reprehensible.

DR. CHURCHILL.—In connection with these cases of osteomyelitis, I had a very interesting case, a little girl of eight, who had multiple osteomyelitis following a severe typhoid: osteomyelitis of both tibiae, both radii, and some swelling on the forehead supposed to be of the same nature. Dr. A. D. Bevan operated upon both tibiae and both radii, and the pus obtained from all showed pure culture of the typhoid bacillus.

Another interesting point about this case was that there was as a complication a lobar pneumonia. I was not called to see the child until the seventh day, and then because the child had been out of sorts for a week and had become suddenly worse the day before. The history of the case during the first week suggested the possibility of typhoid and yet there were perfectly plain signs of pneumonia, and no enlarged spleen or rose spots. Blood examination cleared the case up, a positive Widal reaction being obtained on the eighth day. Another interesting condition of the blood was a white count of 10,000 on this same day (eighth), a "draw" between the pneumococcus infection trying to increase the white cells and the typhoid infection trying to diminish them.

DR. LA FÉTRA.—Cases of osteomyelitis in young children are not so very infrequent. In the last five years I have seen eight. It is comparatively easy to make the diagnosis when the disease is below the knee or in the arm, but when a patient appears with pain and swelling in one hip it is more difficult. The majority of the cases I have seen turned out to be osteomyelitis of the femur. Early operation in these cases will save both life and limb.

DR. ROTCH.—I do not wish to be misunderstood as to my attitude toward the surgeons, or toward the laboratory workers. What we want from the laboratory men is an exact report. When they examine a specimen of milk, for instance, they are apt to report that it is a good or a poor milk, and what they call poor may be just what we want. But I am not in the position of agreeing with Dr. Adams that the reports of their diagnoses are impertinences. In a great many cases I want the diagnosis from the laboratory, because it is an expert opinion. I cannot pretend to give an expert opinion on an examination of urine or blood; we must have the expert to do this for us. So I do not feel quite as strongly as does Dr. Adams on this point. In the case of a blood examination, I want the opinion of the laboratory man as to whether it is a case of pernicious anemia or not. I wish to say that I have the strongest faith in surgeons, and we should understand that we must work together. I am working among my medical cases, the surgeon is working in his branch, and the laboratory man in his. Each is an expert in his special line, and it is only by a combination of all that the best results can be obtained.

In the first of these cases, the surgeon who saw the patient had no means of taking an X-ray and it was sent in as a case of osteomyelitis. We all know that an osteomyelitis may very readily obscure a fracture, and in this case there were the clinical signs of a chronic osteomyelitis. Sometimes these conditions cannot be detected by the surgeon clinically, but need the X-ray.

STATUS LYMPHATICUS AND ENLARGEMENT OF THE THYMUS. WITH REPORT OF A CASE SUCCESSFULLY TREATED BY THE X-RAY.*

BY ALFRED FRIEDLANDER, M.D.,

Cincinnati, O.,

Chief Clinician to the Children's Clinic, Medical College of Ohio, University of Cincinnati; Attending Physician to the Children's Wards of the Jewish Hospital.

For three-quarters of a century the literature has been filled with discussions as to the significance of the enlarged thymus. In the first half of the last century, due largely to the teachings of Kopp, the theory of the etiological relationship of hypertrophy of the thymus and laryngospasm gained wide credence. In 1858 Friedleben's monograph on the thymus, based upon exhaustive anatomical studies, appeared. Friedleben absolutely denied the possibility of the production of laryngospasm by an hypertrophied thymus, and even went so far as to deny entirely the idea of a thymic asthma. For many years Friedleben's views were accepted as correct. But while it was everywhere admitted that laryngospasm and enlarged thymus had nothing to do with each other, anatomical studies (by such authorities as Cohnheim and Virchow) and clinical observations by a host of careful observers were published in great numbers, showing not only that dyspnea from enlarged thymus is a possibility, but that true thymic asthma does actually occur. The discussion of the relationship of enlarged thymus and sudden death now became very active. To explain these cases of so-called thymic death, various theories, based on clinical, anatomical or experimental studies, were advanced. The possibility of such thymic death—by direct pressure on the trachea with resulting asphyxia, by compression of the large vessels at the base of the heart, or of pressure on mediastinal nerves—was emphatically proclaimed, and the claims apparently substantiated by the anatomical findings. On the other hand, these theories were as vigorously denied by other observers whose reasoning and evidence seemed hardly less faulty.

New light was thrown on this vexed question of thymic death by the masterly monograph of Paltauf, published in 1889. As a

* Read before the Academy of Medicine of Cincinnati, March 18, 1907.

result of his anatomical studies, Paltauf came to the conclusion that enlargement of the thymus constituted but one manifestation of an abnormal constitutional state. He found that in his cases of sudden death, without apparent cause, there was not only an enlarged thymus, but in addition a hyperplasia of the entire lymphoid apparatus. He found enlargement of the lymph nodes in various parts of the body, of the faucial tonsils, of the lymph follicles at the base of the tongue, of the intestinal follicles, together with enlargement of the spleen and hypertrophy of its follicles. In addition to these changes in the lymphoid system of the body, there was a characteristic find in the circulatory system. The aorta as well as the smaller arteries were smaller and thinner than normal, so that there was real hypoplasia of the entire arterial system. In some of the cases there were signs of acute dilatation of the heart; sometimes there was more or less degeneration of the heart muscle. In this broader conception the enlargement of the thymus was made to constitute but one manifestation of a general constitutional abnormality, and it is one of the brilliant achievements of Paltauf to have demonstrated that the enlarged thymus, in and of itself, could not produce death. In older patients showing the signs of this condition, Paltauf was able to show the blood picture of chlorosis, and so his name of lymphatic chlorotic constitution finds its justification. More commonly, perhaps, the condition is known as status lymphaticus. The claims of Paltauf found acceptance rather slowly at first, but the accumulated evidence of later years has abundantly justified his teaching, and today the status lymphaticus is generally recognized as a clinical entity.

The chief characteristics of this condition as formulated by Paltauf and generally accepted by pathologists and clinicians today may be briefly summarized as follows: Generalized enlargement of the lymph node groups in various parts of the body, hypertrophy of the tonsils, of the follicles at the base of the tongue and of the intestinal follicles, enlargement of the spleen and its follicles, the presence of a thymus of variable size—in some cases a persistent thymus at a time of life when normally the thymus has atrophied. In addition there is found a narrowing and thinning of the walls of the aorta and of the rest of the arterial system. With this there may be signs of acute cardiac dilatation; that is, a large, soft, pale heart muscle, showing in some cases

the beginnings of degeneration. These individuals are usually of pale, pasty habitus; and in older patients the blood picture of chlorosis is constant. Sudden death is extremely common in these cases at all ages, either as the result of apparently insignificant trauma, or occurring without assignable cause. It is noteworthy that in children with status lymphaticus, the prognosis of the acute infections is much more serious than in normal children, in that sudden death at any stage of the affection is frequent. Furthermore, it is now known that patients with status lymphaticus take anesthetics very badly. Many of the cases of death under anesthesia are in reality attributable to this underlying constitutional abnormality. Death may occur either just at the beginning of the administration of the anesthetic—during narcosis—or just after the exhibition of the anesthetic is concluded. It is thus a matter of importance to determine if possible, before an anesthetic is to be given, whether status lymphaticus exists. Status lymphaticus, as such, produces no definite subjective symptoms. Where there is an enlarged thymus, definite symptoms (ordinarily pressure symptoms) may manifest themselves. Congenital stridor, cough or attacks of thymic asthma may supervene and may aid in the establishment of the diagnosis.

With reference to the diagnosis of status lymphaticus *intra vitam*, there has been, even in recent years, much discussion. In the case of children, the observations of Escherich and Daut have found general acceptance, in that they note a peculiar pasty, heavy, anemic habitus, with an appearance not unlike that of rickets or scrofula at times. The demonstration of the lymphatic hyperplasia is, of course, not difficult. The enlargement of the superficial lymphatic glands, of the tonsils, of the follicles at the base of the tongue and of the spleen, can, of course, be made out easily, and these findings are of great diagnostic importance. Particular stress is to be laid on the finding of an enlarged thymus. While it is claimed by a few clinicians, even today, that the diagnosis of enlarged thymus—*intra vitam*—is exceedingly difficult, or well nigh impossible, the general trend of opinion would incline to the view that such a diagnosis can be made with absolute certainty. Biedert and v. Mettenheimer have shown that where marked hypertrophy of the thymus exists in young children, inspection may show a protrusion of the upper part of the sternum. Various authors have noted that on palpation in the jugulum a distinct

tumor mass can be felt. The percussion finding is of the greatest importance, even though it be admitted that enlargement of the anterior mediastinal lymph nodes may, in older individuals, cause possible confusion. It is generally accepted, as Biedert has shown, that the normal area of thymus dullness, even in young children, ought not to extend beyond the limits of the sternum to any great degree. A most careful study of this question of thymus dullness, and its normal and pathological limits, has been made by Blumenreich. This study included a large series of children, observations being taken both during life and after death. One feature of particular value in Blumenreich's work was that, in many instances, he was enabled to study the thymus dullness in the same child, ante- and post-mortem, so that he could compare and verify results. Blumenreich came to the following conclusions: In young children there is a definite form of thymus dullness, in the shape of an irregular triangle or truncated cone, whose base is the sternoclavicular junction and whose apex is the second rib. The sides extend but very slightly beyond the margins of the sternum, slightly more on the left than on the right side. Dullness extending more than 1 cm. on either side, concealing the note of pulmonary resonance between the heart dullness and the normal area of thymus dullness, shows, in the absence of other causes, an enlarged thymus. Simply engorged lymph nodes in the anterior mediastinum cause no dullness, while caseous nodes do. It is noteworthy that percussion dullness in cases ante- and post-mortem was practically the same.

Hochsinger has made a careful radiologic study of the thymus with reference to the relation of enlarged thymus to congenital stridor. While the radiosopic picture of the normal thymus, as obtained by Hochsinger, does not agree in all respects with the findings of Blumenreich, he, too, holds it to be settled that where the thymus shadow "extends much to the left of the sternal margin, the gland must be considered to be enlarged." Hochsinger, in fact, lays a great deal of stress on the percussion finding, using it as a control for the interpretation of his radiograms. Indeed, he says specifically that "marked broadening of the shadow, particularly a covering over the right side of the heart shadow to any considerable degree, occurs *only* in cases with thymus hypertrophy demonstrable by percussion." Later on he says again: "In 26 of these cases we were able to demonstrate hyper-

trophy of the thymus by percussion, and in all of these cases the radiosopic examination showed a broadening of the thymus shadow."

Definite symptoms are not to be expected in infancy in these cases, unless the picture of compression by the enlarged thymus, or definite thymic asthma, supervenes. The existence of a congenital stridor, the onset of cough, without physical signs in the lungs, the occurrence of definite asthmatic attacks, with extreme dyspnea and cyanosis, in the absence of cardiac lesions, should excite suspicion, and the finding of the physical signs as above detailed will justify the definite diagnosis.

The therapy of this condition has hitherto proven most unsatisfactory. For a long time treatment was wholly symptomatic; indeed, many observers are even today of the opinion that there is no known method of therapy that can be of avail. Thus Ohlmacher, writing in 1906, says that "except for the treatment indicated for rickets when this disorder is combined with status lymphaticus, we have at present no therapeutic resources for the latter condition."

In view of the fact that the enlarged thymus is doubtless responsible for many of the symptoms, attention has for some time been directed to this gland. Whether the symptoms of thymic asthma are produced by direct pressure on the trachea (a point concerning which there has been almost endless discussion), whether the pressure effects are exerted on the large vessels, on the heart itself, or on the mediastinal nerves, or whether, finally, Svehla's theory of hyperthymization is correct, it appears to be indubitable that in some way the pressure of the enlarged thymus exercises a pernicious influence and does produce some of the cardinal symptoms of the condition. Accordingly, many therapeutic efforts have been made in the direction of counteracting the effects of the enlarged gland. Many clinicians have sought to overcome the pressure effects of the enlarged thymus, which in some cases apparently can produce a tracheostenosis, by low tracheotomy. These efforts, as in the case reported by Carter, for instance, have been uniformly unavailing. Solis-Cohen, referring to the known antagonism of the action of thyroid and adrenals to the thymus, has suggested that the use of thyroid and adrenal might be of possible therapeutic value, a suggestion which, so far as I have been able to learn, has not been followed

by results. On the other hand, Escherich finds as a basis for the constitutional anomaly, an autointoxication resulting from abnormal functions of the thymus, and therefore suggests feeding these patients thymus gland. In addition, various authors have recommended general tonic treatment—sea baths, iodid internally and externally over the region of the thymus, etc.

Surgical intervention has been apparently successful in some cases. Thus Siegel reports the case of a boy, two and one-half years old, with attacks of thymic asthma for five weeks preceding his admission to hospital. Tracheotomy was done without avail. The introduction of a long cannula gave relief, but the cannula caused ulceration and had to be removed. Two months later the anterior mediastinum was opened and it was seen that the thymus moved up with every respiration. The gland was sutured to the periosteum of the sternum at the jugulum. Complete relief was afforded. Koenig, in the case of a three-months child that had thymic dyspnea from its second week, extirpated part of the gland and sutured the rest to the sternum, while Purucker extirpated the entire thymus, with perfect recovery, relief from pressure symptoms and without reported ill effect.

In 1903 Heinecke published the results of his studies on the effects of the X-ray on lymphoid structure. He exposed young animals for varying periods on successive days, and then later killed the animals and studied the changes in lymphoid tissues. He found that in young animals (guinea pigs, rabbits and dogs) changes in the spleen occurred very promptly. There was a marked increase of pigment, disintegration of many cells and reduction in the size of the Malpighian bodies. With this, there was rarefaction of the cellular elements of the spleen pulp. It is noteworthy that these changes occurred before any skin lesions took place. Analogous changes to those seen in the spleen follicles occurred in all the lymph node groups of body, in the follicles of the intestine and, in very young animals, *in the thymus*. He adds that "it is *possible* that in the human being analogous changes in lymphoid tissue might occur without any reaction of the skin. This might be of therapeutic value. One might try this therapeutic measure in cases in which an abnormally large thymus is the basis of the trouble."

The case to be reported is of interest, both because of the clear clinical picture presented and also because the hitherto untried

experiment of treatment of an enlarged thymus with the X-ray was astonishingly successful.

E. M., male, was born December 3, 1904, the first child of healthy parents. There was neither tuberculosis nor syphilis in the direct antecedents. Labor was not especially difficult—forceps were not required. Examination by the accoucheur showed an apparently normal infant, birth weight $6\frac{1}{2}$ pounds. The mother's breasts did not secrete and the child was therefore artificially fed from the first, diluted cow's milk being given. I saw the child for the first time when it was three weeks old, having been consulted because the food mixture did not seem to agree with it. A cursory examination made at this time was negative. The food formula was changed and consent given to the circumcision of the child. The circumcision had no bad effect, though the surgeon reported the hemorrhage as having been rather profuse. As stated, the birth weight was $6\frac{1}{2}$ pounds. On December 24th the weight was 6 pounds, 12 ounces. On December 31st this had risen to 7 pounds, 4 ounces, which was also the weight on January 7th. About this time the mother noticed that the child had a slight cough, and that there was a peculiar whistling noise during inspiration. On January 9th (the child then being five weeks old) the cough had become worse and was noticeably paroxysmal in character. During these paroxysms there was some cyanosis, especially of the face and upper extremities.

Careful examination of the child made at this time, in conjunction with Dr. F. Forchheimer, revealed the following condition: The child lay on its back with head retracted. The face was pale, lips bluish, expression anxious. Rectal temperature normal. Respirations were shallow, 70 to the minute, with marked retraction of the diaphragmatic border on inspiration, and distinct inspiratory stridor. A short, dry cough was frequent. At intervals there were definite paroxysms, asthmatic in character, lasting from five to ten minutes. Examination of the lungs was absolutely negative, except for occasional large moist râles at the bases posteriorly. The heart sounds were clear. There was distinct dullness over the upper portion of the sternum, extending laterally from the margin of the bone about 2 cm. to the right. This dullness extended downward more than 2 cm. below the level of the second rib. On the left the dullness extended

beyond the margin of the sternum fully 3 cm., and merged into the area of cardiac dullness. On deep palpation in the jugulum, a rounded firm mass could be distinctly felt. The liver was not enlarged. The spleen was just palpable. At this time the anterior and posterior cervical, the axillary and the inguinal lymph nodes could be easily felt, being about the size of large peas.

Based on the finding of the greatly enlarged thymus, with the cough, the inspiratory stridor, the asthmatic attacks, the pressure cyanosis, the enlarged spleen and lymphatic glands, with absence of cardiac or pulmonary lesion, the diagnosis of status lymphaticus and enlarged thymus was made. The only medication ordered at this time was sodium bromid in 1 grain doses.

During the next few days the child's condition grew steadily worse. The cough increased in frequency, and the asthmatic paroxysms became worse. At times these paroxysms lasted over an hour, being accompanied by marked cyanosis and leaving the child completely exhausted. Indeed, on several occasions after these paroxysms it seemed that respirations would cease. The child took its nourishment well, though the taking of the bottle frequently brought on a paroxysm. Sleep was usually restless, being broken by the cough, which continued even in the intervals between the paroxysms. The bowels were constipated, but the stools obtained by enemata were practically normal. The urinary secretion was free, the urine normal. On January 20th (the child being then seven weeks old) it was noted for the first time that there was distinct dullness in the right interscapular space. Above this area of dullness, which was about the size of a silver dollar, there was distinct bronchial breathing, this being the only spot where bronchial breathing could be heard. The temperature at this time, as previously, was normal. This dullness in the interscapular space was, of course, attributed to enlarged bronchial lymph nodes, the bronchial breathing being due to compression of the lung above. The enlargement of these nodes was considered as only another manifestation of the status lymphaticus.

Up to this time treatment had consisted in the use of sodium bromid and iodid (given internally in the form of iodonucleoids) and inunctions over the thymus, of iodin-vasogen. During the paroxysms, oxygen inhalations had been used freely, though they did not seem to be of much avail. At this time

codein phosphate in doses of $\frac{1}{400}$ grain was given every four hours. The effect on the cough was not particularly noticeable. Except for the appearance of marked edema of the hands and feet, the next few days saw no change in the child's general condition.

The rather desperate character of the case had been fully explained to the parents, who expressed their willingness to allow any possible therapeutic measure to be tried. It was, therefore, decided to try the effect of the X-ray. On January 30th an X-ray apparatus was installed in the house and the first treatment given by Dr. W. H. Crane. The child was laid on its back and a sheet of lead with fenestrum was placed so that the opening left the region of the thymus exposed. The time of the first treatment was one minute. The child was then turned, and the sheet of lead so arranged that the right interscapular region was exposed. The treatment to this region lasted one minute also. No changes in the child's condition in any particular were noted after the treatment. The second treatment was given on February 1st, the exposures being three minutes each, anteriorly and posteriorly. On the day following the second exposure, my notes show that there were several bad paroxysms, as well as cyanotic attacks without cough. On February 4th the signs of cardiac dilatation were distinct. The codeia was stopped and Tr. strophanthus, $\text{m} \frac{1}{15}$, ordered *t. i. d.*

February 6th.—The circulation was much better. The color was good. Four minute exposures were given anteriorly and posteriorly.

February 8th.—Five minute exposures given. The area of dullness in the right interscapular space was distinctly smaller in size.

February 10th.—Five minute exposures. The general condition was decidedly improved. The cough was less frequent, and the paroxysms shorter and less severe.

February 12th.—Five minute exposures. This was the seventh treatment. There was *no* dullness to be made out in the interscapular area. The area of the thymus dullness on this day was noticeably smaller in size than it had been. The cough was less frequent. This was the first day without any paroxysm.

X-ray treatments were given on the 15th, 18th, 21st, 24th and 27th of February. During this time the condition continued to improve. The paroxysms became fewer in number and much less

severe. During two of these days there were no paroxysms. On several occasions during this period, it happened that the child was able to sleep from one feeding period to the next undisturbed. The inspiratory stridor disappeared completely.

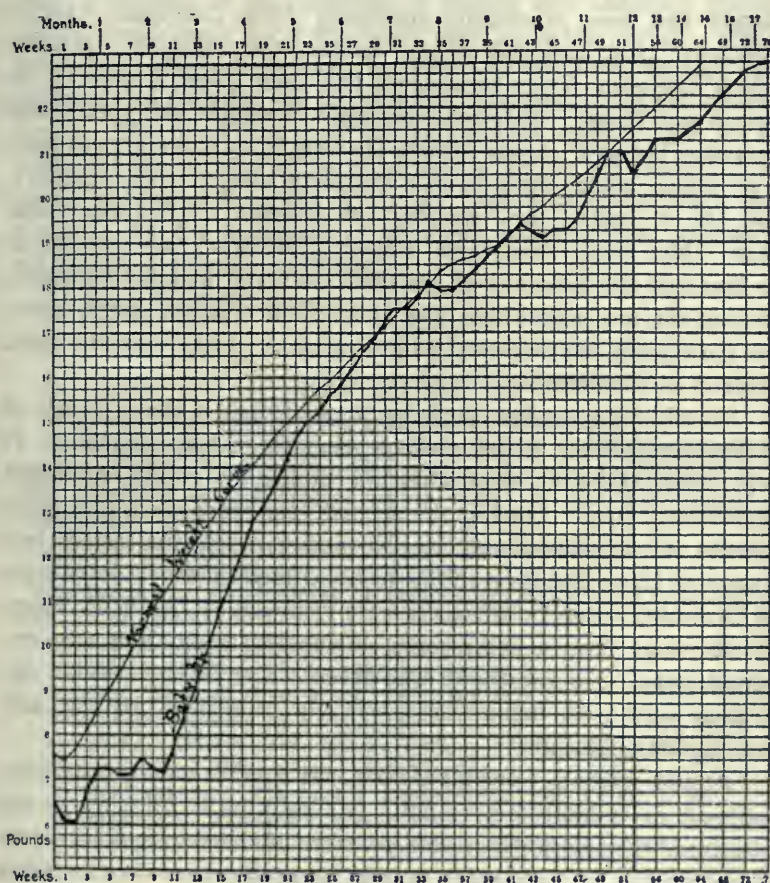


CHART SHOWING WEIGHT CURVE FOR EIGHTEEN MONTHS.

Examination on February 27th showed perfect resonance in the right interscapular space. The area of thymus dullness had diminished decidedly and did not extend laterally on either side of the sternal margin more than 1 cm. It was now possible to define, clearly, the upper limit of cardiac dullness. Over the bases of the lungs there were a very few mucous râles. There

was no cardiac dilatation. The edema of hands and feet had completely disappeared.

From this time on, the child's condition became steadily better, and its development was apparently that of a normal child. As will be seen by reference to the chart on page 499, the child's weight had been practically stationary from December 31st to February 11th, a period of six weeks. On February 18th, by which date nine X-ray treatments had been given, a gain of 10 ounces was noted. Thereafter the gain in weight was steady and exceedingly rapid. At six months the weight, 15 pounds, 13 ounces, was much more than double the birth weight (6½ pounds), and at a year, the weight, 20 pounds, 8 ounces, was more than triple the birth weight. Dentition was normal as to time and the eruption of the teeth occurred without difficulty. During the first year there was at intervals a slight cough without paroxysms and without cyanotic attacks. Otherwise the child showed no abnormality.

Shortly after its first birthday the child had a sharp attack of follicular tonsillitis, which yielded promptly to the salicylates. It was noted, however, that after the attack the tonsils remained persistently large. During the second year there were two more attacks of tonsillitis, and by November, 1906, the tonsils had grown so large that they almost touched each other. Accordingly in December, 1906, both tonsils were removed by Dr. S. E. Allen. At the same time, a small mass of adenoid vegetations was cut away. No anesthetic was given. The child stood the operation very well, hemorrhage was not especially profuse, and healing was prompt.

At this writing, February, 1907, the child is a large, well-developed, exceedingly active boy. Mentally he is fully up to the standard. Except for a certain paleness of the skin and for occasional attacks of rather dry cough, he presents no demonstrable abnormality. The case is unusual partly because of the possibility of making the definite diagnosis of status lymphaticus based on the classical signs and the definite symptoms of thymic asthma; still more perhaps because of the remarkably successful results of the experimental use of the X-ray therapy. The child is now perfectly well and so far as we can tell absolutely normal.

That the X-ray produced a diminution in the size of the thymus and of the bronchial lymph nodes does not admit of question.

The facts that the subsequent development of the child has been normal, that the external lymph nodes and spleen are no longer enlarged, are indisputable.

Again, the fact that the child could successfully withstand such a trauma as the removal of tonsils and adenoids without shock would speak for a resistance fully up to the normal. Under all circumstances, therefore, the results of the X-ray therapy with reference to the enlarged thymus are most gratifying and encouraging. The procedure is of course infinitely simpler than the removal of the thymus by surgical means, and it would seem justifiable to hope that in the X-ray we have a valuable therapeutic resource for the treatment of what has hitherto been considered an almost desperate condition.

4 West Seventh Street.

REFERENCES.

- Paltauf. *Wien Klin. Woch.*, 1889, No. 46; 1890, No. 9.
Kundrat. Quoted by Friedjung, *Centralb. f. den Grenzgebiete der Med. und Chir.*, 1900. (This is a critical and most excellent study of the literature of the subject up to 1900. A full bibliography is appended.)
Ohlmacher. *Detroit Medical Journal*, March, 1906.
Carter. *Medical Record*, April 2, 1904.
Solis-Cohen. *Transactions of College of Physicians, Philadelphia*. Vol. XXVI., 1904.
Escherich. *Berl. Klin. Woch.*, 1896, No. 29.
Siegel. *Berl. Klin. Woch.*, 1896, No. 40.
Koenig. *Deutsch. Med. Woch.*, 1898, No. 3.
Purrucker. Quoted by Friedjung.
Heinecke. *Münch. Med. Woch.*, 1903, p. 2,090; 1904, p. 785.
Biedert. *Berl. Klin. Woch.*, 1896, No. 26.
V. Mettenheimer. *Jahrbuch f. Kinderheilk.*, Vol. XLVI., p. 55.
Blumenreich. *Virchow's Archiv.*, 1900, p. 35.
Hochsinger. "Stridor Thymicus Infantum," Vienna, 1904.

Infantile Tuberculosis. — Bruck reports (*Münchener med. Woch.*, December 4, 1906) the case of a child a few months old, born of a mother who had had tuberculosis, but had been apparently cured. The child died apparently of tuberculous meningitis. At the autopsy it was found that it had been suffering from general tuberculosis, as shown by caseation of the bronchial glands, extensive tuberculosis of the lungs, tuberculous meningitis, internal and external hydrocephalus, tuberculosis of the spleen, kidneys, liver, mesenteric glands, and of the occipital bone.—*New York Medical Journal*.

PNEUMOCOCCUS ARTHRITIS IN INFANTS AND CHILDREN.*

BY A. F. FURRER, M.D.,
Cleveland, Ohio.

The object and scope of this paper are:

1. The report of a case of pneumococcus arthritis in an infant sixteen months old.
2. The tabulation of 26 previously recorded cases of pneumococcus arthritis occurring in infants and children.
3. The presentation of a summary from a study of the literature and the appendant series of cases.

CASE: Pneumococcus arthritis, Lakeside Hospital, No. 28 of this series. Infant, A. G., male, sixteen months old, admitted to the Lakeside Dispensary June 7, 1906. From the mother the following *history* was obtained:

Four days previously the right elbow became swollen and painful. Two days later the left knee began to swell. Previous personal history showed several attacks of gastroenteritic indigestion.

Physical Examination.—Well developed, well nourished infant. Looks sick. Evidently feverish and in considerable pain. Cries lustily on being touched. Right elbow and left knee reddened, swollen, hot and very tender. No signs of fluid elicited. Temperature 103° F. Pulse rapid, estimated at 150. Child's clothes were not removed. Recommended for admission to the hospital.

Diagnosis.—Acute articular rheumatism.

The patient was immediately admitted to the service of Dr. Edward F. Cushing, where a more careful examination revealed in addition to the joint lesions a beginning Pott's disease. The chest was found to be negative. White cell count, 34,000.

The chart during the next two days showed a temperature varying from 101° to 103° F. The pulse rate 130 to 180. Respiration 46 to 60.

* Read before the Cleveland Academy of Medicine, March 1, 1907.

The hospital records state that under rest and medication the *knee* improved steadily, the swelling going down considerably and the infant moving the joint freely. The *elbow* changed but little, and forty-eight hours later was still much swollen and reddened, hot, and gave the sensation of the presence of fluid on palpation. The patient was transferred from the medical side to the service of Dr. Dudley P. Allen, June 9th. White cell count, 27,000.

Operation, June 9, 1906, by Dr. Dudley P. Allen.

A 4 cm. incision was made behind and above the elbow and about one and one-half ounces of thick yellow pus obtained. A second incision was made opposite and internal to the first and the two connected. The bones were bare but the abscess did not extend through the joint. The wound was drained.

The bacteriological report made from the pus showed a pure culture of an organism morphologically similar to and showing the cultural characteristics of Fraenkel's diplococcus.

Animal inoculations were not made.

The patient made an excellent recovery and was later discharged to the Rainbow Cottage to complete his convalescence.

Three months later (September, 1906) Dr. C. E. Ford reported that the wound had entirely healed, that there was no deformity of the elbow joint and that there was an almost perfect result as regards motion.

Early in November the spine had improved so much that on examination Dr. Feiss could find nothing abnormal.

About one week later the temperature suddenly rose to over 106° F., then came down again, but remained irregularly elevated for the next few days.

The records state that there were marked gastric symptoms and that there had been all along considerable abdominal distension.

In December signs of pneumonia appeared, and two weeks later symptoms pointing to an abscess in the liver developed. On January 3, 1907, the patient died.

Unfortunately, permission for an autopsy could not be obtained. The patient lived, therefore, for six months after the original joint infection, and to all appearances had made a satisfactory convalescence within a few weeks of the operation.

The condition of the spine (Pott's disease) was considered as

healed about two months *before* the final infection which carried off the patient.

Cases of pneumococcus arthritis have been reported from time to time by numerous observers of several nationalities since 1888. Leroux, in his *Thèse pour le Doctorat*, 1899, under the title "Les Arthrites à Pneumocoques," reports a series of 28 cases in detail, 26 occurring in adults and 2 in children; of the latter, one is not included in this series of cases, however, as the arthritis did not go on to the suppurative stage, but cleared up under rest and medical treatment. It is stated that Fraenkel's diplococcus was demonstrated in the *sputum*, and it is interesting and suggestive that a pneumonia did actually develop seven days after the onset of the joint symptoms.

We are very much indebted to Leroux for the thorough manner his thesis has covered the subject of this specific form of arthritis, and although it was written about eight years ago it remains the most complete communication on this subject I have been able to find.

Case, in an article in the *Lancet* of January 12, 1901, reports 3 cases of pneumococcus arthritis and appends them in tabular form with Leroux's 28 cases, making 31 cases in all.

The *British Medical Journal* of April 21, 1906, contains another valuable contribution to this subject by Scretin and Wrangham, who jointly report in detail a case occurring in a boy of sixteen years, at the same time tabulating 25 additional cases which they found in the literature in the five years following Case's contribution.

In this last series of 25 cases only 6 occurred in infants and children, 5 of which were reported together by Dudgeon and Brunson in the *Lancet* of August 1, 1903. I have included these 6 cases in this series.

Cole, in *American Medicine*, Vol. III., No. 22, tabulates 10 cases of pneumococcus arthritis. In this list 1 case occurred in an infant of four months and 1 in a child of two and one-half years. These 2 cases I have also included in my table.

Goldthwait, in the *Boston Medical and Surgical Journal* of April 7, 1904, reports, under the title of "Infectious Arthritis," a series of 13 cases. Only 1, and that one occurring in a child, proved to be a pneumococcus infection of the shoulder joint.

The balance of the cases in this table were obtained by look-

No.	OBSERVER.	PUBLICATION.	DATE.	AGE.	SEX	SECONDARY TO	SEAT OF ARTHRITIS	NATURE	COMPLICATIONS.	REMARKS.	RESULTS.
1.	Boulloche.	Lancet, Jan. 12, 1901.	1891	5 years.	M.	Pneu. 3 d.	R. & L. K.	Supp.			D.
2.	Nicolayson.	Am. Med., Vol. III., No. 22, p. 905-908.	1898	4 months.	?	Pneu 8 d.	R. E.	Supp.	Belat. Empyema. Pericarditis.		D.
3.	Hagenbach Burkhardt.	Am. Med., Vol. III., No. 22, p. 905-908.	1898	2½ years.	F.	Pneu. ?	S. & K.	Supp.	Abscess on arm & thigh.		R.
4.	Dudgeon & Branson.	Lancet, Aug. 1, 1903.	1903	5 months.	F.	Bronchitis. 14 d.	L. K.	Supp.	Rt. ear. (Otitis Med.)	Heart blood cul.	D.
5.	Dudgeon & Branson.	Lancet, Aug. 1, 1903.	1903	6 years.	M.	Otitis Media.	L. K. R. H. & W.	Supp.			D.
6.	Dudgeon & Branson.	Lancet, Aug. 1, 1903.	1903	6 months.	?	Primary.	R. Leg & Knee.	Supp.	Mixed infec.		D.
7.	Dudgeon & Branson.	Lancet, Aug. 1, 1903.	1903	14 months.	M.	Pneu. 14 d	R. E.—R. K.	Supp.		Animal inoc.	R.
8.	Dudgeon & Branson.	Lancet, Aug. 1, 1903.	1903	19 months.	?	Measles 14 d.	R. H.	Supp.			R.
9.	Tubby.	Arch. Ped., Vol. XX., p. 610.	1903	14 weeks.	M.	Primary.	R. K.	Supp.			R.
10.	Slaughter.	Am. Med., Vol. V., p. 605.	1903	15 years.	M.	Pneu. 9 d.	R. K.		Tuberculosis R. K.		R.
11.	Salmon.	Arch. Gén. de Méd., p. 191-509.	1903	2½ months.	?	Primary.	Large joints.	Supp.	Syphilis.		D.
12.	Not rep'ted	See Lakeside Hospital Rec.	1903	16 months.	F.	Primary.	L. K.				D.
13.	Goldthwait	B. M. & S. J., 1904.	1904	5 years.	?	Primary.	Shoulder.				R.
14.	Pacchioni.	Arch. Ped., Vol. XXI., p. 63.	1904	2½ years.	F.	Broncho-Pneu. Pleurisy.	R. & L. H. L. S.		Pneumococic vaginitis.		R.
15.	Von Brunn.	Arch. Gén. de Méd., p. 194-228	1904	11 months.	F.	Primary ?	R. K.	Supp.		Of slight virulence	R.
16.	Von Brunn.	Arch. Gén. de Méd., p. 194-228	1904	16 years.	F.	Primary ?	R. K.	Supp.	A c. Osteomyelitis.	14th day.	R.
17.	Ciechonski	La Semaine Méd., 1904, p. 166	1904	5½ years.	F.	"Earache & Coryza."	R. H. & W.	Supp.	Staphylococcus abscess of arm.		R.
18.	Davis & Brown.	Lancet, Vol. II., p. 1017.	1904	13 years.	F.	Otitis Med.	R. S. & W.	Supp.	Pericarditis & Endocarditis.	Infarcts in spleen & kidneys	D.
19.	Davis & Brown.	Lancet, Vol. II., p. 1017.	1904	8 years.	F.	Pneu. 2 d.	R. K.—R. H.	Supp.	Empyema (Rt.) Peritonitis.		D.
20.	Ely.	Med. News, p. 930.	1905	4 years.	M.	Pneu. 9 d.	L. H.	Supp.			D.
21.	L. Nattan Larrier.	Arch. Gén. de Méd., p. 520.	1905	15 days.	?	Hare-lip Operation.	R. S.			Op. on 4th day.	D.
22.	Wragham & Scretan.	B. M. Jour., 1906, p. 915.	1905	16 years.	M.	Pneu. 5 d.	R. K.				R.
23.	Herzog.	Arch. für Kinderheilk., Vol. XLIV., p. 444-5.	1906	9 years.	?	Primary.	Wrists ?	Serous.	Septicemia.		D.
24.	Herzog.	Arch. für Kinderheilk., Vol. XLIV., p. 444-5.	1906	5 months.	?	Primary.	Multiple.	Supp.			D.
25.	Herzog.	Arch. für Kinderheilk., Vol. XLIV., p. 444-5	1906	1½ months		Broncho-Pneu.	L. H.				R.
26.	Herzog.	Arch. für Kinderheilk., Vol. XLIV., p. 444-5.	1906	8 months.		Broncho-Pneu.	R. H.				R.
27.	C. P. Howard.	Arch. für Kinderheilk., Vol. XLIV., p. 444-5.	1906	?		Pneu.	R. S. L. A.		Pericarditis. Endocarditis.		D.
28.			1906	16 months.	M	Primary.	L. K.	Supp.	Pott's Disease.		R.

ing through the English, French and German literature, and represent all the cases I have been able to find to date.

It will thus be seen that more than twice as many cases of pneumococcic arthritis have been reported in adults as in infants and children, and that hitherto no attempts have been made to tabulate these cases occurring in infants and children by themselves.

That it is desirable to consider separately any acute arthritic infection occurring in infants and children and compare the picture with the same infection occurring in adults, I think will be generally conceded.

Summary.—From a study of these 28 cases of this specific form of arthritis occurring in infants and children, it will be noticed that the joint involvement is *secondary to a pneumonia in about one-half of the cases*. In one-quarter of the cases the joint lesions followed otitis media, "earache and coryza," bronchitis, measles, etc. In one-quarter of the cases the arthritis was apparently primary. On the other hand, pneumococcus arthritis in the adult is secondary to a lobar pneumonia in about 90 per cent. of the cases. A few cases have been reported in which the pneumonia followed the joint invasion and 3 or 4 cases have been recorded in which the arthritis was the primary lesion. This comparison shows in a striking way the apparently much greater vulnerability of the joints in the young to septic infections.

Diagnosis and Differential Diagnosis.—(1) An acute arthritis occurring in an infant or child coming on from three to fourteen days *after* the onset of a pneumonia or bronchopneumonia and accompanied by pain, heat, redness, swelling and moderately severe constitutional disturbance may be suspected to be a pneumococcic arthritis.

(2) An acute arthritis followed by signs of pneumonia may be suspected to be a pneumococcic arthritis.

(3) An acute or subacute arthritis developing without signs or history of a pneumonia may be due to the pneumococcus.

(4) Acute osteomyelitis would generally show more profound constitutional symptoms. The pain is more likely to be referred to the shaft or epiphyses. Signs of fluid will be slower to appear and more difficult to detect.

(5) Acute articular rheumatism is very rare in infants and uncommon in young children. Generally the joint symptoms are

not so definite and the entire picture is frequently quite atypical when compared to the same disease in the adult. A point of practical importance, however, is that, apart from the history, the appearance of an acute arthritis in a child may simulate closely acute articular rheumatism in the adult. A high white cell count favors arthritis of pneumococcic origin.

(6) Tuberculous arthritis is insidious in onset and chronic in course, generally monarticular; constitutional symptoms are slight or moderate.

(7) Syphilitic arthritis might simulate a tuberculous arthritis in onset and course; other tertiary syphilitic lesions may be present or may develop. The history may be significant.

(8) Gonorrheal arthritis would be more acute in onset than tuberculous or syphilitic arthritis and less acute than pneumococcus arthritis. Even a persistent discharge about the genitals must not lead us to consider gonorrhea too seriously, for Pacchioni reports a case of an acute arthritis of pneumococcic origin in a girl two and one-half years old following bronchopneumonia, in which there was a pneumococcic vaginitis.

The diagnosis, therefore, can be made only from the bacteriological findings.

Clinically, there appears to be considerable difference in the virulence of the pneumococcus; the general resistance of the patient must also be considered in every instance. It is well known also, and has been confirmed by experiments on animals, that trauma, or previous disease in a joint, predisposes to acute arthritic infections. A perusal of the literature suggests that some cases get well on rest in bed and fixation of the affected joints with or without medication. Some joints in pneumococcic polyarthritis go on to suppuration, while others get well. The extent of the damage in suppurating joints may vary even in the same patient (and this variability in virulence may be demonstrated by animal inoculation). Some cases run a subacute course with slight constitutional symptoms. In others there is considerable constitutional disturbance from the beginning with more rapid involvement of the joints, and which, in spite of thorough surgical treatment, quickly show signs of a general extension of the infection and die. Immediately following the evacuation of the pus by the surgeon, animal inoculation should be made in all cases as a routine measure in addition to the regular bac-

teriological examinations. In this way an idea of the virulence of the particular infection may be gained hours before its clinical manifestations and the treatment regulated accordingly.

The larger joints are most commonly affected. The knee in this series of cases was attacked twice as often as any other joint. The shoulders and hips are next most frequently involved and the elbows, wrists and ankles in the order given. In 16 cases out of 28 more than one joint was affected.

Complications.—This means a general extension of the infection and includes pericarditis, endocarditis, empyema, meningitis, etc.

Prognosis.—The mortality in infants and children is about 50 per cent., including all cases. The cases that die, however, are those in which a general extension of the infection occurs. On the other hand, the cases in which the joints alone are involved, if seen early and carefully treated, generally recover.

Treatment.—(1) Absolute rest in bed with fixation of the involved joints.

(2) General supporting medical treatment and nourishing diet.

(3) When signs of fluid are elicited, incision and drainage.

(4) If the patient does not improve after the abscess is opened, or if after a temporary improvement an exacerbation occurs, we must suspect a general extension of the infection. If the original focus of the infection has been thoroughly opened and is draining well, nothing more can be done. The mortality in such cases until now has been practically 100 per cent.

The recent work of Dr. Geo. W. Crile in blood transfusion for hemorrhage and shock and later for the treatment of severe infectious diseases gives us hope that the hitherto very high mortality in pneumococcus arthritis may be materially lowered in the future if the method of direct transfusion of blood is employed *when a general extension of the infection is suspected.*

In hospital practice it might even be possible to select a recent convalescent from pneumonia to be the "donor."

(5) In the event of not being able to get permission of the patient or family to consent to a blood transfusion, a reliable anti-pneumococcus serum should be thoroughly tested.

(6) Finally, in the severe cases, in addition to the regular surgical treatment at the site of the abscess, the judicious com-

bination of venesection and normal saline infusion should be tried, if a direct blood transfusion cannot be done.

While not sanguine as to the efficacy of antipneumococcus serum in pneumonia, I found no allusion to its use in pneumococcus septicemia. Normal saline infusion has likewise not been mentioned in the literature consulted.

In conclusion, I am very much indebted to Dr. Ed. F. Cushing for permission to report the case as well as for his criticism and suggestions during the preparation of this paper, and to Dr. Dudley P. Allen, to whose courtesy I am indebted for the surgical history of the two cases operated upon by him; to Dr. F. W. Ladd for a reference to the literature; to Dr. C. E. Ford for a report of the progress of my case at the Rainbow Cottage, and to Dr. F. Aeberli for his kindness in looking up the German literature for me.

Perforation of the Duodenum by a Hairpin.—Mennacher describes (*Münchener med. Woch.*, December 25, 1906) a case of fatal peritonitis following perforation of the duodenum caused by a hairpin swallowed about five months previously. The patient was a girl of six years, and for four weeks after the foreign body had been swallowed constipating diet and observation of the stools were kept up. Although the hairpin did not appear, as the child suffered from no inconvenience these precautions were gradually relaxed, and during the following four months the little patient gave no evidence of anything being wrong. She then suddenly developed acute abdominal symptoms, and the possibility of appendicitis or intestinal perforation was considered. In the next few hours so remarkable an improvement in the patient's condition occurred, however, that the operation was postponed. About twelve hours later the peritoneal symptoms had returned with full violence, and on opening the abdomen a diffuse suppurative peritonitis was revealed and it was discovered that the blunt end of the hairpin had pierced the duodenum at the junction of the descending and ascending parts, most of the pin still remaining inside the intestine. Death occurred in the night following. The author calls attention to the length of time that the hairpin must have remained in the stomach, as he concludes that the onset of the acute symptoms must have occurred shortly after its passage into the duodenum, and also to the very striking period of remission of symptoms, which is a not unusual feature in cases of perforation of duodenum ulcers.—*Medical Record*.

ECLAMPSIA OF THE MOTHER AS A CAUSE OF EARLY NEPHRITIS IN THE CHILD.*

BY C. G. GRULEE, A.M., M.D.,
Chicago, Ill.

In 1903 Bar¹ found that in autopsies on 17 children born of eclamptic women, all showed marked congestive lesions, but that the signs of cell destruction, especially in the liver and kidneys, were only slightly marked in the majority of cases. In only 2 of these 17 cases did the kidneys show any lesion other than congestion. In these 2 cases there was present cloudy swelling of the convoluted tubules, which contained colloid plugs in their lumens. He concludes that the lesions are those of any toxemia and that, since the lesions of the fetus are less marked than those of the mother, they are, therefore, secondary.

Mori² reports the findings in a child which was born of an albuminuric and edematous, though not eclamptic, mother, and which died on the third day after birth. At autopsy he found fatty degeneration of the liver epithelium, cloudy swelling of the convoluted tubules of the kidneys, which were also congested. There were thrombi in the cerebral vessels. The placenta was infarcted. This child nursed, and Mori thinks that the toxins already in the body were increased in volume by some absorbed from the breast milk.

Dienst³ reports 2 cases of children born of eclamptic mothers, in both of which casts and red blood corpuscles were found in the urine, and in one of which albumin and leucin were present. At both autopsies he found fatty degeneration of the heart muscle, and fatty degeneration and cloudy swelling of the liver epithelium with areas of necrosis in that organ. The kidneys showed diffuse cloudy swelling and fatty degeneration of the epithelium, edema and infiltration of red blood corpuscles into the intestinal tissue.

In his second case the child died in convulsions on the third day, and, though it is not specifically stated that the child was not fed at the breast, the history seems to justify that assumption.

*Case reported to the Chicago Gynecological Society, November 16, 1906.

Vecchi⁴ gives an exhaustive study of a fetus stillborn of an eclamptic primipara which, at autopsy, showed general anasarca, fetal peritonitis, polydactylism and hare-lip. There was present atresia of the vagina, which organ was filled with urine, there being a fistulous connection with the bladder. The urine contained no albumin nor casts; the liver showed calcareous deposits on its surface and some areas of degeneration. The kidneys were microcystic. He regards the findings in his case as secondary to the fetal peritonitis, and inclines to Veit's theory of toxemia from the syncytial elements as the cause of the eclampsia.

During the past year Gilmore⁵ has taken up the subject of kidney affections in children with special reference to their prenatal origin. He records observations in six different families which lead him to conclude "that this prenatal impairment of the kidneys does predispose and is an almost universal factor in producing an early postnatal nephritis." The autopsy findings in his cases are so absolutely in accord with those about to be reported that it is unnecessary to repeat them here.

The following case is, therefore, of interest from the standpoint of the pediatrician, as well as from that of the obstetrician. The case was one of Dr. De Lee's, from whose clinical report I have taken the following facts:—

P. Y., primipara, aged twenty-four years, Polish. Eclamptic convulsions began at 9 A.M. the day before entrance into Provident Hospital. Entered hospital October 24, 1906, at 9 A.M. Convulsions every ten or fifteen minutes; bladder contained only a few ounces of urine, which showed casts of all kinds and red and white blood corpuscles. Woman was eight months pregnant, and labor had begun when Dr. De Lee first saw her, at 11 o'clock A.M. Cervix small, admitting only one finger. Membranes were ruptured and usual treatment of morphia hypodermatically, chloral by rectum, sweats and saline infusion was instituted. Patient improved for about an hour, then convulsions recurred and continued at intervals of ten minutes. Vaginal Cæsarian section was attempted, but owing to the extremely edematous condition of the parts it was impossible to terminate the delivery in this manner. Abdominal section was then performed and a normal, though small and premature, child was delivered. The mother had a few convulsions after the delivery. She was discharged from the hospital well November 19, 1906.

As to the baby, Dr. De Lee says: "It lived up to the fifth day, during which time it was as healthy a baby as I remember ever having seen."

On the day after birth the child weighed 4 pounds, 2 ounces. It was normal in every way until the afternoon of the fourth day, when the temperature rose to 101.4°F. The next morning the temperature was normal. During this time the child was fed artificially, or at the breast of a patient in the obstetrical ward, who was perfectly healthy.

On the morning of October 29th, while I was in the hospital, I was asked by the nurse in charge to see the child at once, as it was having a convulsion. When I saw the child it had ceased breathing. It was revived by the use of hot and cold baths and atropin, $\frac{1}{500}$ grain, hypodermatically; this was at 10:30 A.M. Between this time and the time of its death, at 12:30 noon, it had several similar attacks. The autopsy was held at 8 P.M. the same evening by me, and showed the following:—

Baby Y., male; aged five days; autopsy about eight hours after death; weight, 4 pounds, 2 ounces (day of death); length, 46 cm. Cord dry, but not detached. Postmortem rigidity present; lividity present over back and marked on right side of head and chest; no external marks; skin icteric; anterior fontanel $3 \times 2\frac{1}{2}$ cm. Posterior fontanel open and parietal bones soft; all sutures open.

Chest.—Breast plate negative; pleural cavities contain no fluid.

Thymus.—Weight, 44 grams. Reaches as low as upper border of fourth rib on both sides, covering both auricles. Microscopically.—Corpuscles of Hassall present; gland normal in structure.

Lungs.—Everywhere crepitant but dark in color; hemorrhagic areas on the bases of both lungs, which, under the microscope, prove to be true hemorrhages into the tissue.

Heart.—On the posterior surface of the left ventricle is a small white blister-like area, .75 x .5 cm., whose borders are continuous with the heart surface. On microscopical examination we find that this seems to be made up of several large sinuses lined with endothelium and lying between the heart muscle and the epicardium. The inner wall of the innermost of these sinuses either lies directly on the heart muscle, or is separated from it

by a thin layer of connective tissue. At the edge the external covering is continuous with the epicardium of the ventricle. Valves of the heart normal; foramen ovale and ductus arteriosus closed.

Abdominal Cavity.—No fluid. Bladder distended, reaching midway to umbilicus.

Liver.—Dark red, markings distinct. Microscopically, there is seen a degeneration of the parenchyma of the hepatic cells. (Some question about this because sections were not good.)

Gall Bladder.—Bound by adhesion to the pyloric portion of the stomach and the hepatic flexure of the colon. Ducts patent. Gall bladder contained no bile, but a thick glairy mucus.

Stomach and Intestines.—Negative.

Pancreas.—Weight, 2.2 grams. Digested carbohydrate, proteid and fat.

Spleen.—Rather dark in color, otherwise negative.

Left Kidney.—Weight, 7.8 grams. Fetal lobulations. Uric acid infarcts.

Right Kidney.—Weight, 8.7 grams. Hemorrhages in capsule, otherwise same as left. In neither kidney could I detect any macroscopical changes other than the ones here given.

Microscopically, both kidneys show a high degree of cloudy degeneration of the parenchyma of the cells, with loss of nuclei in places, those of the glomeruli probably being least and those of the convoluted tubules most affected. In no place could I detect any interstitial change.

Bladder and Urine.—Distended, probably, containing about 10 c.c. of urine. Urethra patent. Urine contained a large amount of albumin, epithelial cells showing granular degeneration in large numbers, a few leukocytes and red blood corpuscles (though I was able to obtain no reaction for hemoglobin) and an occasional granular cast.

Brain.—In opening the cranial cavity the membranes all over the convexity and base were seen to be acutely congested, and over the posterior parietal and anterior occipital lobes near, and extending into, the precuneate and cuneate lobes are two small hemorrhages the size of a dime or larger, one on each side.

Anatomical Diagnosis.—(1) Acute parenchymatous degeneration of the kidneys. (2) Hemorrhages into the meninges, lungs and right perirenal tissue. (3) Acute parenchymatous

degeneration of the liver. (?) (4) Lymphectasia of the vessels of the posterior wall of the left ventricle. (?) (5) Adhesion of the gall bladder. (6) Prematurity. (7) Icterus.

The lesions here recorded can all be explained on the basis of a toxemia, with the exception of the adhesions of the gall bladder and the peculiar cystic formation on the heart.

If we assume that death was due to a severe toxemia, and I think we are justified in so doing, a question arises as to the source of the poison. There were no signs whatever of umbilical infection, neither local nor general, so that this source of toxemia can be excluded. Can we regard the condition as being dependent on the eclampsia of the mother? The onset of the convulsions in the child resembled very closely that so often seen in cases of puerperal eclampsia. In this respect it resembles the second case of Dienst. However, the child was not at any time nourished at the breast of the mother and, therefore, received no new poisons from her milk. Therefore, if the toxemia originated in the mother and was carried to the child prior to its birth, it must either have slowly produced its deleterious effects upon the infant's organs and, aided in turn by the disturbance in metabolism thus brought about, caused a sudden clinical manifestation of its existence, or else it must have remained latent for the period of four days, at the end of which time it suddenly became active. The latter might readily explain the meningeal and perinephritic hemorrhages, and also those in the lungs, but the degree of degeneration present in the kidneys is so great that we can hardly regard it as due to a sudden effort of these organs to eliminate a poison, no matter how severe the poison might have been. If the toxin were elaborated in the body of the child we must regard the process as having existed before birth, and hence in some way intimately connected with the eclamptic condition of the mother; therefore, it would seem that no matter from what standpoint we study the case, we are forced to recognize the intimate relation between the convulsive state of the mother and the convulsive state of the child.

Though we cannot draw too far-reaching conclusions from the few cases here reviewed, we can, at least, say that a certain proportion of children born of eclamptic mothers come into the world with kidney functions markedly impaired. Though a large number of these children are born dead, and another portion, as

the one here mentioned, die soon after birth, still a certain number survive the immediate postnatal period.

No matter how we regard puerperal eclampsia, whether as a clinical entity, or a group of many different forms of toxemia, we must admit the probability of the poison passing through the placental walls and, therefore, the involvement of the fetal organism.

Therefore, it seems to me to be justifiable to regard eclampsia in the mother as one of the causes of the so-called "idiopathic" nephritis which we encounter in children. How important a factor it might be remains to be determined by extensive clinical investigation.

I wish to thank Dr. J. B. De Lee, whose patient the child was, and Dr. A. J. Booker, the interne at the hospital, for his assistance.

REFERENCES.

1. Bar, Paul. "Des Lésions du Foie et des Reins chez les Fœtus nés de Mères Eclamptiques." *L'Obstetrique*, 1903, Vol. VIII., pp. 289-322.
 2. Mori. "Eclampsia del Neonato ed Albuminuria Materna." *Ginecologia*, 1904, Vol. I., pp. 612-627.
 3. Dienst. "Ueber den Verbreitungsweg des Eklampsiegiftes bei der Mutter und ihrer Leibesfrucht." *Monat. f. Geb. u. Gyn.*, 1904, Vol. XIX., pp. 1-13.
 4. Vecchi. "Di un Caso di Anasarca e Peritonite in Feto Nato da Donna Eclamptica." *Rassegna d'Ostet. e Ginec.*, 1905, Vol. XIV., pp. 529, 585.
 5. Gilmore. "Insidious Affections of the Kidneys in the Young, with Direct Bearing on the Prenatal Origin." *Annals of Gynecology and Obstetrics*, 1906, Vol. III., p. 621.
-

Etiology of Infantile Tuberculosis.—Calmette endorses (*La Presse méd.*, December 22, 1906) the recent article by Comby, in which the attention of the profession was called to the extreme frequency with which children become infected with tuberculosis from centers of infection within their own families, and he thinks the cases to be rare in which such infection occurs through the medium of cow's milk. He also believes that the infection usually enters through the intestine and lymphatics, and that the primary tuberculous lesion is always vascular.—*New York Medical Journal*.

A STUDY OF HOSPITAL AND DISPENSARY MILK IN WARM WEATHER; WITH SPECIAL REFERENCE TO PASTEURIZATION.

BY J. H. MASON KNOX, JR., M.D.,

AND

EDWIN H. SCHORER, M.D.,

From the Laboratory of The Thomas Wilson Sanitarium, Baltimore.

Although it is undoubtedly better to supply infants, who must be artificially fed, with *raw* milk when it can be obtained shortly after milking and kept properly refrigerated, these essential conditions are difficult to fulfill during warm weather, and there seems to be a general agreement among pediatricians that some method of heating, by pasteurization or sterilization, must be resorted to when the milk is intended for homes where the refrigeration is inadequate.

Several years ago the quality of the milk supplied to the working classes in Baltimore was studied during two successive summers at the laboratory of The Thomas Wilson Sanitarium. Much of the milk on sale at the small stores was shown to be unfit for consumption, having a high bacterial count, and in many instances containing preservatives.

Last summer, in the dairy, milk-room and ward kitchens of the Sanitarium, an opportunity was presented to obtain samples of milk at its various stages from the cow to the baby, and to study the bacterial count of both raw and superheated milk at different intervals and temperatures. The milk supplied to several milk dispensaries in Baltimore was also studied under similar conditions. It is hoped that these investigations may shed some light on the value of pasteurization.

A word or two descriptive of the production and care of the milk at the Sanitarium may be advisable. The small herd needed for the babies' milk consisted of four grade cows tested with tuberculin. They were provided with abundant pasture, and were milked in an ordinary farm stable, well drained and white-washed. An experienced dairyman took entire charge of the cows

and did all the milking. All the precautions suggested in the best dairy barns as to cleanliness were scrupulously carried out.

Immediately after milking each cow the milk was passed over a cooler, which reduced the temperature to about 12°C. (53-6°F.). The cooler and parts were sterilized with live steam once a day, and kept as nearly bacteriologically clean as possible. As soon as the entire milking had been cooled it was taken to the ice-chest at the milk-room. The evening's product, after cooling, was placed in a gravity cream separator, thoroughly refrigerated, and in the morning the skimmed milk was drawn off, leaving a 16 per cent. cream. The morning's product was used as whole milk. From this cream, skimmed and whole milk, the modifications were prepared and placed in sterile feeding bottles. The greater part of the feedings were kept in a large ice-chest in the milk-room, while a few bottles of each milk mixture were sent to the ice-chests in the wards.

The number of bacteria in the milk immediately after cooling was remarkably low, varying from 0 to 400 per c.c.* The number increased but little after cooling over a cooler which had been recently sterilized, but when the cooler was simply washed off with boiled water and allowed to stand over night, the bacteria in the milk immediately after cooling were greatly increased; in one count to 105,000 c.c. A cooler, therefore, although macroscopically clean, is worse than useless unless it has been recently sterilized.

It was shown, on repeated examination, that after the milk had remained in a gravity separator, packed in ice over night, nearly all the bacteria were to be found in the upper (cream) layer. Thus the counts for the skimmed milk were never over 400 per c.c., while the number of bacteria in the cream from the same milk was usually over 6,000 and once reached 64,000 per c.c.

The bacterial content of several mixtures of whole or skimmed milk with the cereal waters was determined at intervals of a few hours each after modification, the mixtures being kept at varying degrees of temperature.

It was found that at 12° C. (53.6° F.) there was no bacterial increase in twenty-four hours in either milk or the cereal modifications; whereas, when the temperature of the ice-chest rose above this point there was rapid bacterial proliferation, although

*All of our counts were made on agar plates, the milk was diluted 1:100 with sterile water, and the plates were counted after two days.

the count at the time of modification was low. This was shown by numerous tests. Thus, a mixture of skimmed milk and rice water, which contained when prepared 300 bacteria to 1 c.c., had no increase in bacteria in twenty hours at 12° C. (53.6° F.), but a mixture of barley water and whole milk rose in bacterial content, in the same time, from 3,900 to 252,000 in 1 c.c. at a temperature of 17° C. (62.6° F.). This latter temperature is manifestly too high, but was as low as could be conveniently obtained in an ordinary well-filled ice-box which was opened frequently throughout a midsummer day, the temperature of the room being over 26° C. (78.4° F.).

This experience illustrates the difficulty of keeping raw milk sufficiently cool in the refrigerators of private families, and suggests unpleasant possibilities when no attempt at refrigeration is made, as is frequently the case among the poor.

The effect of pasteurization upon the bacterial content of milk kept under similar conditions, at varying intervals after milking, was next studied.

The pasteurization was carried out as follows: After the milk mixtures were prepared in the individual feeding bottles, these were placed in racks in the large steel steam-chest, into which live steam under no pressure was passed. After five minutes the temperature rose to 80°C. (168°F.). The steam was then turned off until the heat in the chest fell to 70°C. (158°F.), at which it was kept for fifteen minutes. After this interval the temperature of the milk in quart bottles was 67°C. (152.6°F.), in 8-ounce bottles 68°C. (154.4°F.), and in 4-ounce bottles 69°C. (156.2°F.).

Numerous tests were made of milk and cream pasteurized in this manner, and it was conclusively shown that nearly all aerobic bacteria were destroyed by this method of heating, and that there was little appreciable increase in the number of bacteria in twenty-four hours, in the several milk mixtures, even when these were kept at a temperature of nearly 17° C. (62.6° F.).

We now undertook an examination of the milk at the various milk dispensaries conducted in Baltimore by the Sanitarium. The investigations were made on warm summer days, and, in several instances, several hours after the delivery of the milk at the stations. Samples were taken from four to six different mixtures at each station, and agar plates prepared immediately. A second

series of plates were made from similar samples which had been allowed to remain at room temperature for twenty-four hours. Pasteurization carried out in a manner very like the one used at the Sanitarium was then ordered, and a few days afterward another double series of plates were made from samples collected shortly after delivery at the stations, and, again, after twenty-four hours. The results have been tabulated that the contrast may be more easily indicated.

		AS DELIVERED		AFTER 24 HRS. AT ROOM TEMPERATURE	
		Number of Samples	Averages of Plates Possible to Count	Number of Samples	Averages of Plates Possible to Count
(1) Form A	Raw	4	256,000	4	13,060,000
	Pasteurized.	1	201,000	2	a
	Pasteurized.	1	Spreading colonies	0	.....
(2) Form B	Raw	5	503,445	3	9,080,000
	Pasteurized.	0	.....	3	a and 3,000
	Pasteurized.	0	.....	0	....
(3) Form C	Raw	6	81,800	3	8,034,000
	Pasteurized.	1	1,600	2	a
	Pasteurized.	1	300	1	a
(4) Form D	Raw	7	86,214	3	9,124,000
	Pasteurized.	1	1,600	2	18,200 and a
	Pasteurized.	1	Spreading colonies	1	a
(5) Form E	Raw	6	45,450	5	a
	Pasteurized.	3	1,050	2	186,000
	Pasteurized.	1	Spreading colonies	0	.....
(6) Form F	Raw	6	22,833	5	10,786,000
	Pasteurized.	0	.....	2	217,600
	Pasteurized.	1	Spreading colonies	0	.....

a = Plates containing discrete colonies, but too many to count or estimate.

(1) 1 part milk and 3 parts water.

(2) Whey-cream mixture.

(3) 1 part milk and 2 parts water.

(4) 1 part milk and 1 part water.

(5) 2 parts milk and 1 part water.

(6) 3 parts milk and 1 part water.

These results show clearly that raw milk may be unsuitable and dangerous food in warm weather unless kept at an extremely low temperature. As this adequate refrigeration can rarely be obtained in the homes of the working classes, it is desirable that milk, especially that used by infants, should be thoroughly pasteurized before or immediately after delivery. It should then be kept as cool as possible until used.

Additional tests were made from milk purchased from one of the best dairies in the city. The milk was pasteurized (commercially) before delivery. The average of three counts at the time of purchase, early in the morning, was 44,000 bacteria to 1 c.c., and after twenty-four hours' incubation, at room tem-

perature, colonies on the plates were too numerous to be counted.

Investigations were also made of five pasteurized formulæ as prepared by one of the best known dispensaries in New York City. At the time of delivery three formulæ contained less than 500 bacteria per c.c., one less than 50,000 per c.c. and one more than could be counted. After remaining twenty-four hours in the ice-chest the bacterial content did not vary materially from that at delivery, but of duplicates kept at the room temperature, three contained too many bacteria to be counted, one contained more than 500,000 bacteria per c.c. and the other 100,000 bacteria per c.c.

Various investigators have ascribed to raw milk a bactericidal power. The presence of this property is, however, far from established. Heineman has reported some investigations on the subject which may reconcile the results of the different writers on this subject. He finds that for certain species of bacteria there is a bactericidal substance in raw milk, while for other species there is none. Moreover, this germicidal property does not assert itself after milk is from five to seven hours old. This power is also destroyed after heating the milk to 56°C. for thirty minutes, or by bringing to the boiling point. Accepting these results, it was evident that bactericidal power of raw milk plays no part in milk dispensary milk, for this is always more than seven hours old. We undertook several experiments to determine the comparative bactericidal power of whole and diluted milks.

It was found that there was apparently a slight deterrent action on the part of raw milk upon the proliferation of bacteria during the first few hours after milking. This was however by no means constant, and after about seven hours the bacteria multiplied rapidly unless the milk was kept cold.

No constant differences in the germicidal properties of milk mixtures were found from the use of water sterilized by being passed through a Chamberland filter or by boiling.

Neither raw nor pasteurized milk seems to exert any definite deterrent action upon the growth of the Flexner-Harris type of *B. dysenteriae*. Therefore it is evident that the much talked-of bactericidal action of milk is of little or no aid in maintaining the low count desired in a milk used in infant feeding.

One important change brought about in milk by pasteurization is the destruction of the lactic acid bacteria, but not the spores of

some peptonizing organisms. As a result, raw milk coagulates on standing without proper refrigeration, while pasteurized milk does not, but frequently develops a putrid odor. The changes wrought by peptonizing bacteria are therefore more difficult to detect. These organisms were thought by Pflügge* to be particularly dangerous. Their growth can be checked by cold.

This study emphasizes the importance of pasteurizing all milk designed for infant feeding during the summer months. Pasteurization should be done as soon as possible after the milk is produced.

It has long been known that the deleterious products of bacterial action are not destroyed by heating the milk. Moreover, the ingestion of dead organisms, for example the tubercle bacillus, may set up changes in the body and activate existing lesions.† Refrigeration should not be dispensed with even after prompt pasteurization, but when milk so heated is kept at a moderately low temperature it is a much safer product, after twenty-four hours, than the best raw milk under similar conditions.

The value of milk dispensaries would be increased if ice-boxes and a daily supply of ice during the summer were provided for those who cannot procure it for themselves.

Significance of Cytodiagnosis and Therapeutic Value of Lumbar Puncture in Tuberculous Meningitis.—Olimpio Cozzolino (*Riv. di Clin. Ped.*, February, 1906) states that there is no true pathognomonic sign of tuberculous meningitis. Leucocytosis has been considered a sign of this affection, and the bacteriological examination of the blood may give some clue to the diagnosis, although it will not show the location of the trouble. The author has examined the blood in 11 cases of which he gives the histories. He concludes that the cytological examination of the blood in infantile tuberculous meningitis gives a useful element for diagnosis. Polynucleosis is not rare in basilar meningitis in the presence in the blood of either many or few tubercle bacilli. Other means of diagnosis should be employed at the same time. The degree of pressure of the cerebrospinal fluid, the quantity, etc., are not of great diagnostic value. As to its therapeutic value, lumbar puncture may be said rarely to give any relief.—*American Journal of Obstetrics.*

* *Zeitsch. f. Hygiene*, 1894, Vol. XVII., p. 272.

† A. Calmette and M. Breton-Compte. *Rend. de l'Acad. des Sciences*, 1906, T. 142, pp. 441.

SUGGESTIONS FOR REDUCING THE INFANT MORTALITY FROM SUMMER DIARRHEA.

BY CHARLES HERRMAN, M.D.,
New York.

The infant mortality from summer diarrhea in New York City is still exceedingly high and is to a great extent preventable.

In 1904, of 1,000 deaths during the months of July, August and September, 102 occurred in infants under one year from summer diarrhea. In 1905 there were 105 in 1,000 deaths during the same time; 1903 was a comparatively good year, with a tolerably cool summer. The following data from the last annual report of the Department of Health will show the importance of this subject:—

In 1903 there were 65,571 deaths in New York City from all causes. Of these, 14,015 occurred in infants under one year; that is, 21.3 per cent. There were 91,895 births, making the mortality under one year 15.2 per cent. Of the 14,015 deaths under one year, 3,769 were from diarrhea; that is, 26.8 per cent. Of these, about 64 per cent. occurred during July, August and September.

The total deaths at *all* ages from diphtheria, scarlet fever, pertussis, measles and smallpox were 3,761; that is, less than those under one year from diarrhea alone.

The reduction of the infant mortality in New York is essentially the reduction of such mortality in the tenements.

As a member of the "Summer Corps" of the Department of Health during the last few years, the writer received the impression that, though very much good was done in various ways, the amount was not in proportion to the energy expended, probably because it was not utilized to the best advantage; that is, where it was most needed.

In the summer of 1906, with the permission of Dr. Cronin, Assistant Chief Inspector, I adopted the following plan:—A district on the upper West Side, consisting of six square blocks, was chosen. This district contained a mixed population, about two-thirds white and one-third colored. There were 180 tenements

containing about 2,000 families. The larger number of the tenements were of the twenty-family variety, with four families on each floor. Each apartment consisted of three rooms, with a total capacity of about 3,000 cubic feet. One room faced the street or yard. The other two had each one window opening into the air-shaft.

A census of the children under two years was first taken. This included, besides the name, age and address, the number of children living and dead; and how many, if any, died of summer diarrhea. The character of the feeding of the infant examined was noted, and whether it had had any digestive disturbance.

There were 310 children under 2 years.

Of these,	174	were	"	1 year.
" "	106	"	"	6 months.

Those under one year were divided, according to months, as follows:—30, 14, 18.—14, 15, 15.—12, 12, 11.—7, 11, 15.—174.

Of these 174, 114 (65 per cent.) were breast fed.

Of those from 1- 3 mos. 75% were breast fed.

" "	"	3- 6	"	68%	"	"	"
" "	"	6- 9	"	57%	"	"	"
" "	"	9-12	"	51%	"	"	"

Of the 114 who were breast fed only

44, or 40%, were fed correctly according to interval

70, or 60%, " " incorrectly " " "

between each feeding. This shows the importance of instructions to mothers of nursing infants.

In the instructions to mothers, emphasis was placed on:—

1. Importance of breast feeding.

2. The correction of errors in feeding. In those cases in which condensed or loose grocery milk was being used, bottled milk, the milk from one of the Straus depots, or that from a "Diet Kitchen" in the district was substituted. In the *few* instances in which raw milk was being used, boiling was advised. Where other improper food was being given, such as fruit and vegetables, this was stopped.

Of the 310 infants, the following were chosen for special attention:—

1. Infants under one year artificially fed.

2. Infants whose mothers were very ignorant or careless.

3. Infants with past or present digestive disturbance.
4. Infants in families in which one or more children had died from summer diarrhea.
5. Infants in the care of a person not the mother.

From July 5th to September 15th (the period during which the work was done) there were eleven deaths from summer diarrhea, all in infants under one year. Of these, three died before they were seen, viz.: two on July 8th and one on July 10th. Seven died in July, three in August and one in September. According to age, they were distributed as follows:—One month, two; three months, two; four months, three; six months, one; eight months, one; ten months, two. Five of the eleven had been regularly fed on condensed milk. In the families of four, other children had died of summer diarrhea or marasmus.

The intelligence of the mothers in the district visited was not above the average in tenements. Almost all the colored children were rachitic, many very markedly so.

Although the total number of cases is not sufficiently large to justify any definite conclusions, I am convinced that such a selection of cases needing special attention will give the best results.

With the great improvement that has been and is being made in the milk supply of New York, the greatest stress should be placed on the instruction to mothers. Not long ago in a tenement on the West Side I saw a mother who had lost five babies from summer diarrhea. The sixth she was feeding on condensed milk.

In the poorer tenements the mothers receive their instruction in infant feeding and hygiene most frequently from: (1) neighbors or other members of the family; (2) midwives, and much less frequently from (3) physicians at dispensaries; (4) at maternity hospitals; (5) private physicians, and (6) day nurseries.

In almost all cases the advice of neighbors is incorrect. Having raised a certain number of their own children successfully, they consider themselves fully competent to instruct others. They make no allowance for differences in different children. Not long ago I saw in a rear room of a tenement a case of pyloric spasm in a breast-fed infant. The child was emaciated to the last degree. In the front room lived another mother with a very healthy child of three years. She told me that her child had been exactly the same (marantic) and had fully recovered.

The proper training of midwives is an exceedingly important question, but one which has been given little attention in this country. In the summer of 1903 an attempt was made by the Department of Health to ascertain what percentage of births was not reported. The members of the "summer corps" were asked to inquire as to the physician or midwife who assisted at the birth of all infants. In the district in which I was working I found that one particular midwife had more labor cases than all the physicians in the neighborhood together. According to the annual report of 1903, 51,945 births were reported by physicians; 42,810 births by midwives. As more births are not reported by midwives, it is safe to say that nearly one-half the labor cases are conducted by midwives. Attention has recently been directed to the injury done to the mothers from the insufficient training of midwives, but, as far as I know, little or no attention has been given to the injurious effect on the infant.

It would seem feasible to license all midwives and to issue such a license only after they have passed an examination in the essentials of infant feeding and hygiene. The Department of Health could print a small pamphlet containing the necessary information.

The midwives (as I have ascertained by questioning the mothers) seldom give complete or proper instruction as to feeding, and are in attendance but one week. After that the mother is allowed to shift for herself, and I have found that over 70 per cent. of the infants born under such conditions are improperly fed.

In very few dispensaries is instruction given to mothers in infant feeding and hygiene, irrespective of the condition for which the infant is brought. Such a system would do much to prevent future attacks of indigestion. An inquiry into the feeding in cases apparently well will often reveal gross errors, which always cause some disturbance sooner or later. Such an inquiry should be included in taking the history of the case.

Several of the dispensaries have fortunately secured the services of a "visiting nurse," who visits the homes and demonstrates to the mother the method of preparing the food prescribed by the physician. At the Vanderbilt Clinic such a nurse has been in attendance during the last year and has been of very great assistance to the mothers.

Maternity hospitals could do much by giving mothers detailed instructions in the care and feeding of infants, and, to those mothers who cannot give the breast, demonstrations in the preparation of the food could be given during the last two or three days of their stay at the hospital. By explaining to the mothers the great importance and value of regular supervision a certain number could be induced to report regularly at stated intervals during the first year, in order to have the infant weighed and to receive instruction in care and feeding.

We are dealing with the very poor; they seldom can afford to have a private physician. Even when they do have one, he is not in attendance for more than one week.

The improvement in the physical and intellectual condition of the mothers is undoubtedly the most important factor in this problem. Much is being done and more will be done by charitable organizations to improve the physical condition of these mothers during the period of pregnancy and lactation. It may be safely said that if the mother obtains proper food and freedom from care during these periods she is more likely to give birth to a healthy child, and much more likely to nurse it successfully after birth. Every means should be utilized to make it possible for a mother to stay at home and care for her child at least during the first few months. This is a very large problem, and one which cannot be discussed here.

The present milk supply of New York is comparatively good. In the vast majority of cases the milk is boiled. It is doubtful whether further improvement will greatly reduce the infant mortality. The danger of contamination at the home is fully as great as at the farm. On this account, for the poor, the best method is to supply them with milk in small bottles, each containing the proper amount for one feeding. Such stations for distributing milk must be under medical supervision. Milk should be given only to such infants as cannot be breast fed, and the cases should be examined and weighed regularly. The Straus milk depots would undoubtedly do still more good if the infants receiving milk were under such medical supervision.

Too much stress cannot be placed on the injury of prolonged feeding on condensed milk. It is stated by Newman that the mortality from summer diarrhea is ninety-four times as great in infants fed on condensed milk as on breast milk. There are still

a large number who use it on account of its convenience. The injurious effects are not immediately or strikingly apparent.

Great importance is attached by many to the size and character of the living rooms. This is proper, inasmuch as dirty, ill-ventilated rooms almost always mean an ignorant, careless mother, and therefore careless, improper feeding.

The Department of Health has under consideration a plan according to which the city would be divided into small districts, with an inspector in charge of each district. There would be 100 or more of such districts.

For his future physical welfare, the first year is the most important in the life of the individual. The very poor cannot obtain the proper instruction from the time the infant is born. The mortality during the first month is nearly 10 per cent., so that it is exceedingly important that they be seen early. When the birth certificate is received by the Department the name and address could be sent to the inspector in whose district the birth occurred. He would visit the case if there was no private physician in attendance (after ten days). If the people were poor and, in his judgment, required instruction, this would be given and re-visits made as often as necessary. Cases in extreme need could be brought to the attention of the proper charitable societies. The nurses of the Department could assist by demonstrations to the mothers, at home, of the preparation of the milk.

Estimating that 40,000 infants are born annually in the tenements of Manhattan, with 100 inspectors, each would have the supervision of 400. Of these, probably not more than fifty would require special attention (according to the method of selection above indicated) during the summer months. Each inspector would take a personal pride in having for his district as low a mortality as possible.

(1) Charitable organizations could do much to improve the health of *very poor* mothers during pregnancy and lactation, and make it possible for them to stay at home and take care of their infants during at least the first few months.

(2) From the birth of the child, instruction should be given to such mothers in infant feeding and hygiene.

(3) Such instruction could be given by the inspectors of the Department of Health on the notification of birth, supplemented, in the case of infants artificially fed, by demonstration by nurses of the method of preparing the food.

(4) During the summer months a selection should be made of those cases requiring special attention, namely, those artificially fed, those having ignorant or careless mothers, and those in whose family deaths have occurred from summer diarrhea.

(5) All midwives should be licensed, and a license should be issued only after they show a knowledge of the essentials of infant feeding.

(6) In dispensaries, instruction in the care and feeding of infants should be given to mothers, irrespective of the disease for which the infant is brought.

In a recent address Osler said that the physician is the teacher, not the servant, of the public. In instructing the mothers of the very poor the physician is, in the best sense of the word, a teacher of the public.

250 West Eighty-eighth Street.

Grocco's Triangular Dullness. — Vignola (*Gazz. degli Osped.*, February 11, 1906) discusses the triangular paravertebral area of dullness which was described by and named after Grocco. This dull area is found on the side opposite to that of the pleural effusion. Certain authors having injected one pleura postmortem were unable to find this dull area on the opposite side; but more recent experiments, in which the diaphragm was kept in position by peritoneal injections of gelatine and the aorta filled with similar fluid, confirmed Grocco's original statement; and it was proved that, after the pleura was filled with fluid under these conditions, the paravertebral area of dullness on the opposite side could be easily determined. Although it is not quite clear as to what is the cause of this dullness, actual observation has shown that it is not due to a second effusion. The author records 3 cases of pleural effusion occurring in children (six and eight years old) where this triangular dullness could be well made out. The dullness was observed to vary with the condition of the diseased pleura. In the third case (one of serous effusion gradually becoming purulent) the triangular dullness was marked as long as the effusion was serous, but when it became purulent this paravertebral dullness disappeared.—*British Medical Journal*.

Clinical Memorandum.

HEMORRHAGIC CASTS OF THE BRONCHI, FROM A CHILD ILL WITH ACUTE CROUPOUS PNEUMONIA.*

BY D. J. M. MILLER, M.D.,
Philadelphia.

J. P., a girl of four and one-half years, was taken suddenly ill on the 12th of November. Three days later she was admitted to the Children's Hospital with well-marked signs of pneumonia of the left lower lobe. The child seemed very ill: great dyspnea; marked cyanosis; pulse 160-180; respirations 60; temperature 104° F.; leukocytes 43,624.

On the evening of the day after admission, the fifth of the disease, when the general symptoms were at their height, the pa-



DRAWING OF HEMORRHAGIC CASTS OF THE BRONCHI—ACTUAL SIZE.

tient had suddenly great difficulty in breathing, and after a violent paroxysm of coughing, accompanied by cyanosis, expectorated about $\frac{1}{2}$ ounce of bright-red blood and two large, irregularly cylindrical, pinkish-white masses. Great relief followed their expulsion; the temperature rapidly fell to normal, and by morning the crisis was fully established.

Dr. C. Y. White, pathologist to the hospital, to whom the specimens were referred, has kindly favored me with the following report as to their character: "The casts measure respectively 7 and 5 cm. in length. They are irregularly cylindrical,

* Specimens presented at a meeting of the Philadelphia Pediatric Society, December 11, 1906.

pinkish-white in color, and have no central cavity; they possess, at irregular intervals in their course, twig-like projections of smaller calibre than the central mass. Histologically, the greater part of the casts is composed solely of red corpuscles. The edges of the casts contain a fibrin network, and between the meshes of this numerous leukocytes are to be found. No epithelial cells can be seen on the outer surface of the casts. The casts were no doubt the result of a hemorrhage, which fact is substantiated by the histological findings."

The casts, therefore, are of blood, and not fibrin, as was at first supposed. This view is still further corroborated by the fact that the masses are solid and contain no central cavity, as would be the case had they been due to an extension of the croupous exudate from the finer bronchi and air vesicles into the larger tubes.

But the sanguinolent nature of the casts does not make them any the less interesting. There must have been quite a large out-pouring of blood into the bronchus to have caused coagula as large as these. In addition, at the time of their expulsion, fully 4 drams of fluid blood were expectorated, so that the total loss of blood must have been considerable.

Hemoptysis is not common in pneumonia. It may occur, however, especially as an initial symptom. Stricker, in 900 cases, found profuse hemorrhage in 7. Aufrecht has observed it only once. So profuse may it be, as in a case seen by Musser, that the diagnosis of tuberculosis was made by the attending physician. Walshe, indeed, remarks that profuse hemoptysis occurring in pneumonia is commonly a sign of coexisting tuberculosis, but it may occur quite independently of that affection. Considerable blood may also be expectorated in pneumonia complicated by heart disease. Still, it is an unusual symptom, and in a very extensive experience I have never encountered it in child or adult.

Young children (under five), as is well known, do not expectorate; and older children, when they do, do not differ in this respect from adults, except that, in pneumonia, the sputum seldom presents the characteristic rust-color and viscosity observed in older people.

In the pneumonia of children I can find no records of actual pulmonary hemorrhage; but that careful and experienced observer, J. Forsyth Meigs, met with 6 cases of pneumonia with

blood-tinged sputa in children between five and nine years. He also speaks of a child three and one-half years old, who voluntarily expectorated mucus, copiously tinged with blood, and of an infant within the month, who, during an attack of pneumonia, expelled from the lungs mucus tinged with blood.

The specimens I present, therefore, are sufficiently remarkable to excite interest. As to the origin of the hemorrhage, it probably came from the air vesicles or finer bronchi, as blood in large quantities never has its source in the vessels of the bronchial wall (according to Fowler and Godlee).

As to the site at which the casts were formed, one can only conjecture; but from their general appearance and size it seems likely that the coagulation took place in a medium-sized bronchus, probably on the left side—the seat of the pneumonia.

Some Blood Cultures in Children and Their Significance.—Rotch and Low (*Journal of the American Medical Association*, January 10, 1907) have been particularly impressed with the value of blood cultures in children, especially in those cases where the histories were indefinite and misleading. In cases of this kind a blood culture is the only definite means by which it can be determined whether sepsis is or is not present, and the etiological factor may be established. Their method consists in taking the blood from a vein in the elbow under absolute precaution against contamination; the culture is then immediately inoculated with the blood. The vein at the elbow was found to be the most convenient place. The authors had 680 children under the age of thirteen years, who were examined with regard to the possibility of easily obtaining sufficient blood for a culture; 39 per cent. were positive and 61 per cent. negative. In the first four years the positive cases were 21 per cent. and the negative 79 per cent. In the second four years the positive cases were 72 per cent. and the negative 28 per cent. And in the last group, which included the five years from eight to thirteen, the positive cases were 86 per cent. and the negative 14 per cent. This seems to show that the younger the child, the less likely will a blood culture be possible; yet in a large number it is possible, and it should be attempted when any important information may be obtained.—*New York Medical Journal*.

ARCHIVES OF PEDIATRICS.

JULY, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

ROYAL STORRS HAYNES, Ph.B., M.D.,

ASSOCIATE EDITOR.

COLLABORATORS:

A. JACOB, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CALLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHEY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. E. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

Contributors and Correspondents, see page III.

THE DIAGNOSIS OF PULMONARY TUBERCULOSIS IN CHILDREN.

To one whose experience is mainly with adults, it would seem that the diagnosis of tuberculosis of the lungs in children should present little difficulty. Chest signs in children are easily made out and disease processes cannot ordinarily proceed very far without giving definite evidences to the careful examiner. Notwithstanding this general principle, the diagnosis—both positive and negative—of pulmonary tuberculosis may offer great practical difficulty in a given child. In fact few questions call for more care in examining, or for better judgment in deciding, than, in certain cases, the presence or absence of pulmonary tuberculosis. The difficulty is not so much that of finding the physical signs as that of interpreting them aright.

In discussing cases that present difficulty in diagnosis, one of course excludes at the outset those sufficiently far advanced beyond the "closed stage" as to have ulcerations of the mucous membrane and therefore readily showing tubercle bacilli in the sputum. It is the cases in which bacilli are not to be found in the sputum that present the great difficulties in diagnosis; and these are the very ones in which early diagnosis is most desirable.

There are certain classes of cases that need careful study. Among young infants pulmonary tuberculosis is not uncommon, especially in hospitals. The cases among infants can be grouped into: (1) Those with persistent cough and signs of general bronchitis of the smaller tubes. Some of these are, but the majority are not, tuberculous. (2) Those with emaciation, dry, hacking, often paroxysmal, cough and localized râles, particularly râles in the region of the right nipple. (3) Those with persistent cough and irregular signs of consolidation or of pleural thickening, together with localized râles. Most of the two latter groups prove to be tuberculous, as evidenced later by the appearance of tubercle bacilli in the sputum, if repeated examinations are made of the bronchial mucus obtained by passing a catheter into the lower part of the esophagus and withdrawing the pinched tube.

It must be emphasized here that in certain other infants the physical signs may not be at all suggestive of tuberculosis, and yet tubercle bacilli may be found in the sputum. If a baby is failing and has a cough, or if the baby is failing and one of the parents is tuberculous, repeated examinations for tubercle bacilli should be made, for in many instances they are positive when the chest signs are few and insignificant. So that one might make an additional group of infants in whom the diagnosis is made from the sputum examination regardless of the physical signs.

Among children from three to ten years of age tuberculosis is quite unusual, notwithstanding a prevailing impression to the contrary. At the Vanderbilt Clinic, among 5,000 new patients each year in the Children's Department, very few such cases are seen. Many cases of pulmonary affections occurring in children of these ages are wrongly diagnosticated as tuberculosis, and

some are sent to institutions for that disease; for other bronchial and pulmonary conditions give rise to physical signs that are almost identical with those we have been taught to regard as pathognomonic of tuberculosis. Among these children certain groups of cases present particular difficulty when the sputum is negative. In the first place, those with marked dullness, râles, bronchial or bronchocavernous or amphoric breathing and a history of prolonged cough. Some of these cases have signs that strongly suggest a cavity and yet they may clear up entirely in a few weeks. They are probably cases of slow resolution following pneumonia, perhaps with consolidation around a large bronchus. A second group are those with persistent signs of localized bronchitis, with or without evidences of thickened pleura. Cases of interstitial pneumonia with bronchiectatic cavity give signs identical with pulmonary tuberculosis; but they should not cause perplexity in diagnosis, because the patient is altogether too well for a tuberculous process, considering the extent of the signs and the long history of cough.

Cases of neglected or undiagnosed empyema (usually termed "unresolved pneumonia") should not perplex anyone who makes a careful physical examination, for the flatness, the presence of Grocco's vertebral triangle of dullness on the sound side, and the displaced apex beat, along with absent or distant bronchial voice and breathing, should make the diagnosis of pleural effusion.

In all these groups of cases, infants or children, the interpretation of the puzzling physical signs must depend somewhat upon the history and upon other aids in diagnosis. If the history gives evidence that the child has been in contact with a relative or friend or servant suffering from a chronic cough, or that the child's health has suffered a great change for the worse following an attack of measles, whooping-cough or bronchopneumonia (especially if this complicates either of the foregoing), then one would judge the signs more seriously.

From the signs themselves, an argument that they mean tuberculosis is their irregularity and location. If they are confined to the area of a lobe, and especially a lower lobe, the process is apt

to be non-tuberculous; if irregular and found in the upper lobes, the mid lobe, or in the region of the nipple, it is very apt to be tuberculous.

To aid in diagnosis—in addition, of course, to the constant hunt for tubercle bacilli in the sputum—the tuberculin reaction is in suitable cases invaluable. To infants definitely known to be without fever, milligram doses (or a larger quantity in older children) may be given by injection, and if a rise of temperature of 2° or 3° F. occurs, the case is almost surely tuberculosis. For confirmation of a negative result, a second and larger injection should be made after an interval.

Of recent years the X-ray has been of much service, and, at the hands of experts, plates can be obtained showing early infiltration of the lung before bacilli appear in the sputum.

The tests of treatment and of time remain. But if no tuberculin test has been used and the child rapidly recovers, one may still be left in doubt; for, in view of the cases of healed tuberculosis found postmortem that gave no evidences during life, it must be admitted that some of the cases rapidly recovering may actually be cases of pulmonary tuberculosis.

In the groups of cases mentioned, however, failure to find positive evidence of tuberculosis should give one a very hopeful, almost confident, feeling, for in children the tendency to recovery is so strong that tuberculosis is constantly being overcome.

ASSOCIATE EDITOR.

It is a pleasure to announce to the readers of ARCHIVES OF PEDIATRICS that, beginning with the present number, the Editor will have associated with him in the conduct of the journal, Dr. Royal Storrs Haynes. Besides having previously engaged in editorial work, Dr. Haynes has been for some years interested particularly in pediatrics; formerly as interne in the New York Foundling Hospital, and at present as Physician to the Junior Sea Breeze Hospital, Assistant Physician to the New York Infant Asylum, and to the Out-Patient Department of the Babies' Hospital, New York.

Bibliography.

Essentials of Obstetrics, by **Charles Jewett, M.D.**, Professor of Obstetrics and Gynecology, in the Long Island College Hospital, Brooklyn, N. Y. Third edition, thoroughly revised. 12mo, 413 pages, with eighty engravings and five colored plates. Cloth, \$2.25 net. Philadelphia and New York: Lea Brothers & Co., 1907.

This little book endeavors to place the essential facts and principles of obstetrics within easy grasp of the medical student, and is therefore intended as a practical guide in the ordinary conditions of labor. The great experience of the author has made this, the third edition, a valuable book for the student. The manual relates strictly to obstetrics and does not treat of the infant.

A Manual of Obstetrics, by **A. F. A. King, M.D.**, Professor of Obstetrics and Diseases of Women in the Medical Department of the George Washington University, Washington, D. C., and in the Medical Department of the University of Vermont, etc. Tenth edition, enlarged and thoroughly revised. 12mo, 688 pages, with thirty illustrations and three colored plates. Cloth, \$2.75 net. Philadelphia and New York: Lea Brothers & Co.

This tenth edition of King's well known manual will doubtless be as well received and prove as valuable to students as have the preceding editions. With increased knowledge the book has been enlarged and there are additional illustrations. A chapter which concerns the pediatricist particularly is that upon the resuscitation of asphyxiated children; and the instructions given are very full.

Thornton's Pocket Medical Formulary. New eighth edition, revised to accord with the new U. S. Pharmacopeia. Containing about 2,000 prescriptions with indications for their use. In one leather bound volume. Price, \$1.50 net. Philadelphia and New York: Lea Brothers & Co., 1907.

In convenient pocket form, and thoroughly in conformity with the new Pharmacopeia, this formulary presents a large list of

prescriptions with their indications. Both the metric and the apothecaries' equivalents are given, and there is a table of poisons and their antidotes, a list of incompatibles and a table of doses.

Outlines of Human Embryology. A Medical Student's Handbook of Embryology. By **George Reese Satterlee, M.A., M.D.**, Instructor in Histology and Embryology in the University and Bellevue Hospital Medical College, New York. 12mo, vi. + 173 pages, ninety-nine figures. Cloth, \$1.25 net. New York: John Wiley & Sons. London: Chapman & Hall, Limited. 1906.

This little book gives very succinctly an outline of the important facts of human development. In addition to giving careful explanation to the process of fertilization and the formation of the primary germ layers, the author treats of the general formation of the body, and in the latter part of the book gives in detail the development of each organ.

To pediatricists who meet with many peculiarities and anomalies of development in their practice, a knowledge of embryology is of great importance. This book would serve as a ground work for such knowledge. It would not, however, fill the place of a reference book on development, inasmuch as its scope is too limited.

Suppurative Cervical Glands in Children.—Conforti and Bordoni conclude (*Gazz. degli Osped.*, May 13, 1906) as follows as regards the suppurative processes found so frequently in the cervical glands of young children: Infections of the cervical glands affect in preference children of the delicate type, although those of the robust type are not spared altogether. The most frequent source of these infections are lesions of the hairy scalp or of the face, but more especially of the mouth and throat. Usually these infections are subacute in character, rarely they are acute. In most acute cases the streptococcus is at fault; in a small proportion the staphylococcus pyogenes aureus or albus. This corresponds to the results of experimental infections on animals. In the subacute cases, however, the staphylococcus aureus is the most frequent germ, the remaining germs occurring in the following order of frequency: The streptococcus, the staphylococcus albus, and the aureus combined with the albus.—*New York Medical Journal*.

Society Reports.

MINUTES OF THE NINETEENTH ANNUAL MEETING OF THE AMERICAN PEDIATRIC SOCIETY,

HELD AT THE ARLINGTON HOTEL, WASHINGTON, D. C., ON
MAY 7, 8 AND 9, 1907.

The following members were present: Drs. George N. Acker, Washington; Samuel S. Adams, Washington; Allen Baines, Toronto; A. D. Blackader, Montreal; William D. Booker, Baltimore; Walter Lester Carr, New York; F. S. Churchill, Chicago; Floyd M. Crandall, New York; Charles Hunter Dunn, Boston; Percival J. Eaton, Pittsburg; David L. Edsall, Philadelphia; F. Forchheimer, Cincinnati; Rowland G. Freeman, New York; E. E. Graham, Philadelphia; J. P. Crozer Griffith, Philadelphia; S. McC. Hamill, Philadelphia; L. Emmett Holt, New York; John Howland, New York; A. Jacobi, New York; Charles G. Jennings, Detroit; Charles G. Kerley, New York; J. H. Mason Knox, Baltimore; Henry Koplik, New York; Maynard Ladd, Boston; Linnæus E. La Fétra, New York; J. Lovett Morse, Boston; William P. Northrup, New York; Charles P. Putnam, Boston; B. K. Rachford, Cincinnati; Thomas Morgan Rotch, Boston; John Ruhräh, Baltimore; E. W. Saunders, St. Louis; Henry L. K. Shaw, Albany; Thomas S. Southworth, New York; Charles W. Townsend, Boston; J. Park West, Belaire, O.; Harold Williams, Boston; W. Reynolds Wilson, Philadelphia.

FIRST SESSION, MAY 7TH, 10 A.M.

The meeting was called to order by the President, Dr. B. K. Rachford, who made a few remarks, thanking the Society for the honor bestowed upon him:

Dr. H. T. Machell, of Toronto, and Dr. L. B. T. Johnson, of Washington, were introduced as guests of the Society.

The minutes of the eighteenth annual meeting were adopted as published in THE ARCHIVES OF PEDIATRICS. The President re-

ferred to loss by death of Dr. Leroy Milton Yale, and a committee of three—Drs. Jacobi, Crandall and Freeman—was appointed to draft suitable resolutions and report.

The following papers were read:—

1. Dr. Charles Hunter Dunn, Boston: "The Use in Practice of the Theoretical Resources Provided by Percentage Feeding."

2. Thomas S. Southworth, New York: "Some Conclusions from Our Knowledge of the Proteids of Milk."

3. Charles G. Kerley, New York: "Cane Sugar Feeding in Its Relation to Some of the Disorders of Childhood."

These three papers were discussed by Drs. Rotch, Freeman, Holt, Kerley, Griffith, Churchill, Carr, Eaton, Saunders, Crandall, Dunn and Southworth.

4. Dr. W. P. Northrup, New York: "Hemothorax—Case. Aspiration—Recovery."

5. Dr. F. Forchheimer, Cincinnati: "Anorexia Nervosa in Children."

Discussed by Drs. Kerley, Putnam, Griffith and Forchheimer.

6. Dr. R. G. Freeman, New York, presented an automatic bottle warmer.

Discussed by Drs. Putnam and Freeman.

7. Dr. J. P. Crozer Griffith, Philadelphia: (a) "Three Cases Illustrating Typhoid Fever in the First Year of Life," (b) "Case of Articular Rheumatism in an Infant," (c) "Case of Congenital Biliary Cirrhosis."

Discussed by Drs. Putnam and Eaton.

SECOND SESSION, MAY 8, 1907, 10 A.M.

8. The President's address on "Pseudo-Masturbation in Infancy" was read by Dr. B. K. Rachford, Cincinnati. Discussed by Drs. Jacobi, Holt, Koplik, Kerley, West, R. L. Dickinson (visitor), Ladd, Jacobi and Rachford.

9. Dr. John Lovett Morse, Boston: "'Kernig's Sign' in Infancy: A Study of 2,000 Cases."

Discussed by Dr. Koplik.

10. Dr. F. S. Churchill, Chicago: "Bacteriology of Meningitis."

11. Dr. Samuel S. Adams, Washington; "Grip Meningitis."

These two papers were discussed by Drs. R. H. Fitz (by invitation), Koplik, La Fétra, Morse, Hamill, Jacobi, Churchill and Adams.

12. Dr. Henry L. K. Shaw, Albany; in collaboration with Dr. Leon Baldauf: "Congenital Stenosis of the Duodenum—Report of Case."

Discussed by Dr. Jacobi.

THIRD SESSION, MAY 9, 9:30 A.M.

13. Business meeting. The report of the Council was presented, and upon its recommendation the following actions were taken:—

Officers for the ensuing year were elected as follows: President, Dr. C. G. Kerley; First Vice-President, Dr. David Edsall; Second Vice-President, Dr. Henry L. K. Shaw; Secretary, Dr. S. S. Adams; Treasurer, Dr. J. P. West; Recorder and Editor, Dr. L. E. La Fétra; Member of Council, Dr. R. G. Freeman.

The Society voted to hold its next meeting during the last week in May, 1908, at Delaware Water Gap, Pa.

It was recommended that Professor A. Schlossman, of Düsseldorf, be invited to read a paper at the next meeting.

The annual dues were fixed at \$10, and the Treasurer's report was audited and found to be correct.

There were elected to membership in the Society: Dr. David Bovaird, Jr., New York; Dr. C. A. Fife, Philadelphia; Dr. F. S. Meara, New York.

The proposition of E. B. Treat & Co., in regard to publication of *Transactions* of the Society, was accepted.

It was recommended that the President appoint a committee of three, two from the Council and one from the Society, to revise the constitution and by-laws, and report at the next meeting. The President appointed Drs. Holt, Churchill and Griffith.

It was resolved that no paper be published in the *Transactions* that is not handed to the Editor by December 31st of the year in which the meeting is held.

There were presented the following resolutions on the death of Dr. Leroy Milton Yale:—

"WHEREAS, Leroy Milton Yale had for many years been a

member of the American Pediatric Society and a valued contributor to its transactions, and

"WHEREAS, he was held in great respect on account of his wide range of knowledge and varied abilities, and much beloved for his gentle and affectionate nature, his high ideals and his invariable adherence to these ideals, it is

"*Resolved:* That this Society mourns deeply his loss and extends to the members of his family its sympathy in their bereavement, and

"*Resolved:* That this resolution be spread on the permanent records of this Society, and that a copy be sent to the medical journals and to his family."

(Signed) A. JACOB,
 F. M. CRANDALL,
 R. G. FREEMAN.

14. Dr. Maynard Ladd, Boston: "The Caloric Value of Modified Milk in its Relation to Infant Feeding."

Discussed by Drs. Morse, Koplik, Freeman, La Fétra, Rotch and Ladd.

15. Dr. George N. Acker, Washington, presented "A Case of Myxedema," exhibiting the patient.

16. Dr. John Howland, New York: "The Symptoms of Status Lymphaticus in Infants and Young Children."

Discussed by Drs. Blackader, Rotch, Hamill, Rachford, Howland.

17. Dr. Thomas Morgan Rotch, Boston: "A Study of the Early Conditions of Osteomyelitis in Young Children by the Röntgen Ray."

Discussed by Drs. Adams, Churchill, La Fétra and Rotch.

18. Dr. C. G. Jennings, Detroit: "A Case of Chylothorax."

19. Dr. J. H. Mason Knox, Baltimore: "The Relation of Bacilli of the Dysentery Group to Infantile Diarrhea."

Discussed by Drs. Dunn and Knox.

20. Dr. Maynard Ladd, Boston: "The Need of Greater Accuracy in Prescribing Starch in Infant Feeding."

Discussed by Drs. Southworth and Ladd.

21. Dr. Blackader read for Dr. Martin, of Montreal, a paper on "Peripheral Phlebo-sclerosis in Childhood."

Discussed by Dr. Blackader.

22. Dr. Thomas Morgan Rotch, Boston, presented charts of a series of cases of "Cerebrospinal Meningitis, Treated upon the Basis of the Opsonic Index."

Discussed by Dr. Knox.

The following papers were read by title:—

Dr. F. Huber, New York: (a) "Abscess of Lung in a Child Two and One-half Years Old Due to Wire Nail 2 Inches Long in Right Bronchus; Low Tracheotomy; Removal Through Improved Bronchoscope." (b) "Pneumohydrothorax in a Child Two Years Old; Recovery." (c) "Specimens and Photograph of Resected Ribs in Chronic Empyema."

Dr. John Ruhräh, Baltimore: "The Best Treatment in Chorea."

Dr. A. Cotton, Chicago: "Amaurotic Family Idiocy."

Dr. A. H. Wentworth, Boston: "A Preliminary Report on the Etiology of Infantile Atrophy."

Flies and Tuberculosis.— Lord (*Clinical Contributions, Massachusetts General Hospital*, February, 1906), from experiments upon flies and tuberculous sputum, concluded that flies may ingest such sputum and excrete tubercle bacilli whose virulence may last for at least fifteen days, and that there is a danger of human infection from tuberculous fly specks by the ingestion of such specks upon food. From an inhalation experiment in which a healthy guinea-pig was supplied with air which had passed over tuberculous fly specks it would seem that spontaneous liberation of the bacilli, even when swept by a current of air, does not take place, though probably if such specks became mechanically disturbed infection of the air would ensue. As the result of his observations he suggests that all tuberculous material (sputum, pus, fecal matter, etc.) should be carefully protected from flies, and that greater attention should be paid to the screening of rooms and wards where tuberculosis is treated, and of laboratories where tuberculous material is examined. Since, however, such precautions would not prevent fly infection by tuberculous patients at large, he recommends that a practice should be made of protecting all food so that it cannot become contaminated by flies that may have ingested tuberculous material. *British Medical Journal*.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, December 11, 1906.

ALFRED HAND, JR., M.D., PRESIDENT.

EDEBOHL'S OPERATION FOR NEPHRITIS.

DR. CHARLES H. WEBER showed a patient upon whom this operation had been performed. The child, a girl of four and one-half years, had no history of previous acute disease. Six weeks before admission to the Children's Hospital she had an attack of acute nephritis, for which she was in bed for ten days. She recovered from the edema and was allowed to get up. Two weeks later she was brought to the hospital with general edema, scanty urine, etc. She remained in this condition for a period of nearly nine months, treatment having apparently no effect. It was decided to perform Edebohl's operation. This was done under chloroform anesthesia, the capsules of both kidneys being stripped. Both kidneys were enormous. No change in the child's condition was noted for three weeks, but at the end of that time the edema became less marked and there has been a continuous gradual improvement. At present there is only a slight puffiness of the eyelids.

DR. D. J. MILTON MILLER said that both this case and the case shown last month are under his care at the Children's Hospital. The case shown previously is not much improved, as the child still has edema, and the urine does not show much change. This child's improvement, however, is remarkable. She was water-logged for six months, but she is now better mentally and physically, and the urine also shows a decided improvement. There is no doubt that the operation in this case was a factor in producing this beneficial change in her condition, although many cases of subacute nephritis get well after months, even without operation.

BILATERAL COXA VALGA.

DR. JAMES K. YOUNG presented a case of bilateral coxa valga. The patient was a girl, four years of age, who had never been able to walk or stand,

The clinical symptoms were abduction of the legs with marked external rotation of the femurs and limitation of adduction. The trochanters were below Nelaton's line and the X-ray showed an angle of declination of 174° on the right side and 164° on the left side.

He called attention to the extreme rarity of bilateral coxa valga and attributed this case to the application of forceps in delivery, and did not consider it a congenital case.

The normal angle was described as 135° , he having recently examined a large number of femurs and having found the average angle to be 135° . The extremes of the normal angle were placed between 110° and 140° , any angle below 110° being considered coxa vara and anything above 140° as coxa valga.

He stated that if the attention of surgeons were directed to this deformity more cases would probably be found.

Dr. Young said that the operation for this condition is either osteotomy or division of the abductor muscles. After osteotomy, the angle can be changed. In unilateral cases, a high shoe on the opposite foot is sufficient treatment. The condition is much more common than is supposed, for in 800 specimens 16 cases were found—which is about one-third the number of cases of coxa vara that one would expect to find in this number of specimens.

CONGENITAL DISLOCATION OF THE HIP.

DR. J. T. RUGH showed a case of congenital dislocation of the right hip in a girl now over thirteen years of age, which was reduced when she was past twelve. She presented rather unusual development for a twelve-year-old girl, and, on account of the very serious deformity in walking, an osteotomy was contemplated to overcome part of the shortening. The X-ray showed a fair development of femur and acetabulum, and it was decided to attempt replacement by the method of Lorenz. This proved successful and the leg was placed in plaster in the "frog position" for five months, the cast being removed every two months and the leg freely moved to prevent ankylosis. After this it was gradually brought parallel with its fellow and exercises begun to develop the weakened and atrophied muscles. The patient still walks with a limp, but she shows constant improvement, and the two legs are of equal length. She walks long distances without

discomfort and has no pain at any time, though previously she could not go a square without suffering pain and having to rest. Motion is normal in every direction, but she has not yet developed the degree of muscle control and strength which is to be desired and which will enable her to walk naturally.

DR. YOUNG said that many such cases have been operated upon by the Lorenz method and subsequently lost sight of, and the treatment is too often condemned by men that do not understand the operation. The treatment, to be thorough, requires about two years. The second part of it consists in gymnastics and efforts to restore the wounded and disused muscles.

DR. RUGH said that it is strange that in some cases, although the patients are young, the result is absolute ankylosis. He mentioned 2 cases, one of a child of nine, and the other of one of eleven years. In another patient, ten years of age, in whose case a double operation had been performed, there was perfect motion. In the case shown, that of a girl twelve years old when the operation was performed, there is now good motion. Why ankylosis should occur in one case and normal motion in another, he was unable to explain. In the case of the girl operated upon by Lorenz himself, there was normal muscular development. This girl is well developed, with large muscles. Both cases received the same after-treatment. Dr. Rugh thinks that there must be some peculiarity in the tissues of the individual. Some tissues are more susceptible to traumatism, and its effects in them are more lasting and serious. When surgeons can determine which cases are the more susceptible to traumatism and which are not, they can select their cases better; that is, they can operate upon some children above the age limit, and reject some of the younger ones.

CAST OF THE BRONCHUS.

DR. D. J. MILTON MILLER showed a cast of the bronchus from a child of two years, a full report of which will be found on page 529.

DR. S. McC. HAMILL showed a protective uniform for use in the treatment of contagious diseases.

DR. DAVID L. EDSALL read a paper upon

CASES OF FAT INTOLERANCE, WITH PECULIAR FEATURES,

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, December 18, 1906.

J. W. VAN DERSLICE, M.D., PRESIDENT.

A CASE OF POSTDIPHTHERITIC HEMIPLEGIA.

DR. D'ORSAY HECHT, by invitation, presented the patient, a boy aged sixteen. The family history was negative. With the exception of measles contracted at the age of four, the period of childhood was uneventful up to the time of a severe attack of diphtheria, and at the age of twelve the diphtheria began insidiously and was regarded with indifference until the third day of illness, when the patient was found to be deeply cyanosed, suffering from considerable respiratory embarrassment and palatal palsy, in the presence of an extensive nasal and laryngeal diphtheritic membrane. Two thousand units of antitoxin were immediately administered, and two days later another 2,000. The alarming symptoms subsided and the patient made a rapid convalescence for twelve days. Awakening on the morning of the thirteenth day he asked for a tumbler of water, but let the glass fall before he could raise it to his lips; almost simultaneously there was a brief period of about three minutes' unconsciousness. Recovering from this, it was noticed that his speech was thick and queer, but he could understand and make himself understood. Not until he asked for pen and paper with which to amuse himself by sketching did he realize his inability to move the left hand.

There is no evidence that the patient was aphasic. The speech defect was purely one of dysarthria. It was fully three months before he was able to get about with ease. At no time have there been twitchings or convulsive seizures.

Four years have now elapsed since the onset of the paralysis and the young man presents himself with an unusually well developed physique for his age, a healthy color, firm muscles and apparently sound organs. His eyes are in all respects normal. The cranial nerves show no impairment. There is neither facial asymmetry nor deviation of the tongue. The patient's attitude and carriage in walking are characteristic of his disability, in that the left forearm, slightly flexed at the elbow, is held close to the chest and the fingers are forcibly drawn into the palm of the hand. There is moderate though notable circumduction of the

left leg in walking. The vasomotor phenomena of blanching and reddening of the skin on pressure are not wanting and the dermal surfaces feel considerably cooler to the touch. Other post-plegic motor symptoms, such as tremor, athetosis and associated movements, are lacking. The contractures are of the spastic variety, but nowhere marked except at the distal parts of the extremities, chiefly the fingers. The very slight atrophy present is consistent in degree with that usually noted in cerebral lesions. The upper arm reflexes, especially at the wrist, are exaggerated on the paralyzed side; a brisk patellar and Achilles jerk are present on the left and the Babinski toe-sign is positive, the latter being best elicited by stroking the outer border of the foot or irritating the plantar surface transversely; stimulating the foot along its inner border and under the great toe fails to reveal it. The great toe is in a constant state of hyperextension. The Oppenheim and Gordon signs are absent. Sensory phenomena are negative. The urine is normal.

Dr. Hecht concluded his presentation with a brief review of the literature upon the subject of hemiplegia as a sequel of diphtheria, mentioning the cases collected by Slawyk, Woolacott, Levi and Rolleston.

In his own case, he inclined to the belief that a cerebral thrombosis had occurred on the right side of the brain in the region supplied by the *arteria fossæ Sylvæ*.

DR. WILLIAM J. BUTLER said that hemiplegias following diphtheria are sufficiently infrequent to render the reporting of every case desirable. Their rarity is indicated in the small number of cases, only 65, that Dr. Rolleston had been able to collect up to 1905. Dr. Hecht's is the second case reported to this Society in the past several months.

The histories of these cases suggest certain points in common, namely, that the infection is invariably very severe, and the hemiplegia comes on at a time when convalescence has been established, or is already apparently in progress. It is usually associated with some peripheral paralysis, as, for instance, in this boy, with palate paralysis. There is invariably more or less prior profound cardiovascular disturbance in these cases if carefully watched for.

The point of most interest in these cases of hemiplegia following diphtheria, as in all cerebral palsies of children, is the

etiology. The question naturally arises, Is the hemiplegia in these children dependent upon the same cause that gives rise to the peripheral paralysis, namely, degeneration and interstitial inflammation of nerve tissue? This seems very plausible when we know such changes occur in the posterior nerve roots and in the spinal cord, to which the pseudotabes following diphtheria is referred. Such changes occur in the brain. Reasoning from analogy, one would naturally expect such changes to be the cause of the postdiphtheritic hemiplegias, but postmortem evidence has been entirely to the contrary, as a vascular lesion has been found, chiefly embolism.

It is notable that the trouble occurs invariably in the second or third week, at a time when the heart shows the maximum deleterious effects of the diphtheritic intoxication. And this is the time when the heart of the diphtheria patient should be watched most carefully because disturbances are so frequently overlooked and serious consequences may develop without warning. It is at this point that one observes the rapid, feeble and weak pulse, or the bradycardia, acute dilatation of a diseased myocardium, gallop-rhythm and feeble heart tones, all suggestive of great cardiac weakness and conditions which favor the development of thrombi in remote vessels or in the heart, from which latter emboli can so readily be detached and plug some distant artery, and thus give rise to just such a picture as shown here.

Dr. Butler said he was inclined to take issue with Dr. Hecht in viewing this as a case of thrombosis, because the embolus is such a predominant factor in the causation and because conditions favoring the development of thrombi are so favorable in the heart that embolus from this source by all odds outweighs the other. At the same time an embolus may only incompletely occlude the middle meningeal, and as a consequence the initial injury may be slight and the resulting paralysis be commensurate only with the permanent cerebral ischemia and softening. The case he presented last spring showed the most profound cardiac disturbances for some days prior to the development of the hemiplegia, and its development was very similar to this case.

Another point about these hemiplegias following diphtheria is the relation of the lesion to the subsequent mental development of the child. For instance, in an infant that develops hemiplegia in the early months of life, the possibility of mental impairment

is far greater for the simple reason that those lesions seldom remain localized at this time, but often result in a sclerosis involving an entire lobe or both lobes. But when hemiplegia develops in later childhood the chances of mental impairment are far less; in fact, at that age there is no more chance of mental impairment than there is in the adult with a similar lesion.

DR. HECHT said, in regard to the pathology, that he regarded it as a thrombosis only for the reason that the onset was not sudden, as it would be if an embolism were the factor. Merely from the clinical picture, the mode of onset and the recovery, in the absence of any known cardiac lesion, he doubted if embolism had occurred, although he would concede that in the autopsies the embolic process had been found ten times to only two of the thrombotic.

DR. ERNEST LACKNER read a paper descriptive of

HEUBNER'S SYSTEM OF INFANT FEEDING BASED ON CALORIES.

He quoted Heubner as estimating the energy of a given food by the heat given off in its burning. The amount of food remaining in the body can be expressed in calories by deducting the amount lost through fecal matter, urine, etc., from the amount entering the body.

Food given can be expressed in calories with greater significance than if expressed in weights and measures. It can be stated *a priori* that, for equal units of body weight, there is equal working power in each healthy infant of steady, regular growth.

By carefully examining a considerable number of normal, thriving infants, and being able to control them in every respect so as to establish a proper basis for calculation, Heubner claims to have been able to state the energy power of the food required by the infants.

According to Rubner, mother's milk contains (dependent on fat contents) in

1 litre	614-724 calories
Cow's milk, per litre	690 "
Two-thirds milk, per litre	480 "
One-half milk, per litre (10 per cent. sugar)	500 "
Buttermilk (according to de Jager)	698 "
Liebig's soup (according to Kellar)	808 "
Allenbury's milk mixture	546 "
Asses' milk (Dresden)	502 "

One needs to know the weight of the infant to determine the quantity of any of the above foods to be given to satisfy its energy requirements. An infant weighing 5 kilos would require 500 calories. Cow's milk equals 700 calories per litre. Therefore, he would need $\frac{5}{7}$ of 1 litre of cow's milk or buttermilk, 1 litre of two-thirds milk and $\frac{5}{8}$ litre of Liebig's soup, etc. Of course, the above calculation is based on the premises that artificial food is as good as mother's milk. A high percentage of nitrogenous content in food for infants is not economical because a low percentage answers all demand. Further, nitrogenous food requires good digestive organs. The different proportions of casein and albumin in cow's milk and mother's milk call for no elucidation here. The differences, however, have greater theoretical than practical value. The differentiation and characterization of the several nitrogenous compounds in the organic fluids have not reached that stage that would allow any definite conclusions. What is of greater importance is the presence in mother's milk of substances rich in phosphorus, as nuclein and lecithin, which are not as well represented in cow's milk. In fact, there are more unknown substances in mother's milk than in animal milk.

The doctrine that cow's milk is hard to digest has been disproved by experiments on infants. In fact, it was proven that the nitrogenous compounds of cow's milk were easily and thoroughly digested (about 5 to 6 per cent. loss), and when not made use of in the body were chemically changed and passed in the urine. This doctrine would not have received so much consideration and been so persistently believed, had not daily experiences seemed to prove it. A child could digest diluted milk quite well, but not whole milk. In whole milk the nitrogenous compounds are far in excess of the same in mother's milk, while the fats and sugar are of about the same percentage; therefore, the nitrogenous bodies are the indigestible ones. This conclusion is probably right, but the explanation of the conclusion is interpolated, and this is not right. That is, the conclusion is not based on rigid experimentation.

Rubner and Heubner were enabled to study carefully the effects of artificial feeding of cow's milk on two children—a seven-months-old child and a three-months-old sickly child—and from their observations and studies obtained a clearer idea of the digestion of nitrogenous compounds. What is the

effect on an infant of a nitrogenous diet much richer than a breast child obtains? It does not increase the growth of the child to any appreciable extent, but we have an increased decomposition of nitrogenous compounds, and if we continue for some time this rich nitrogenous feeding, the metabolism of the body is influenced. The increased metabolic processes in the body increase the heat production. This was ascertained in two children to be from 9 to 15 per cent. daily more than in a breast-fed child. This overproduction of heat must be gotten rid of, and in the children examined it was accomplished through increased perspiration and exhalations from the lungs. This all means increased work for the infants.

The digestion and absorption of this richer food, the decomposition and the disposition of the increased heat, all caused extra work for the internal organs without any benefit to the infant and no increase in growth or repair of worn-out tissue. The increase of albumin in the cells of the body is not accelerated by a too rich nitrogenous diet, but is interfered with.

By continuing this rich nitrogenous diet, or, rather, overfeeding, we injure the entire organism. This manifests itself first by loss of appetite. Observation has shown, particularly in delicate children, that it is always better to dilute cow's milk. This dilution, even during the first month of a full-born baby, does not need to be more than will reduce the proteids of cow's milk to equal the proteids in mother's milk. That is, 1 part milk and 2 parts water. This mixture contains 0.9-1.0 per cent. proteids. Of this mixture the same amount is to be given as the child obtains from the breast when nursing, because if more were to be given the reasons for diluting would be negatived.

During the first month we give, of this one-third mixture, 400 c.c.; at later periods of growth 600-700 c.c. in five to six meals daily if we wish to keep proteids to equal that of mother's milk.

It is clear, however, that this mixture has not the nutritive value of mother's milk, volume for volume, because the non-nitrogenous bodies, which are about equal in both fluids normally, are reduced two-thirds in cow's milk. This is the great evil in diluting cow's milk, but one that cannot easily be remedied. Milk sugar, of course, can be added up to 7 per cent., equal to the amount in mother's milk. These differences are not the only ones resulting from diluting cow's milk. The organic substances con-

taining phosphorus, nuclein and lecithin, which whole cow's milk contains in less quantities than mother's milk, are still further reduced.

The physical properties of the milk will be changed in this new mixture. It has been determined by Hans Köppes that cow's milk, notwithstanding its higher percentage of proteids and inorganic salts, has about the same molecular concentration, freezing point and electrical resistance that mother's milk has, and through dilution these properties will be disturbed and thus absorption will be unfavorably influenced. Too great dilutions, four to five times, will conduct too much water to the system and overflow it. For these reasons it is not best to dilute cow's milk any more than absolutely necessary. One part milk, 2 parts water, 8 per cent. sugar, in 100 parts equals 33 parts milk and 66 parts 8 per cent. sugar solution.

	Proteids.	Fats.	Sugar.	Ash.
33 parts milk	0.9	1.2	1.5	0.2
66 parts 8 per cent. sugar solution			5.3	
	0.9	1.2	6.8	0.2

This mixture, viewed as an ordinary chemical mixture, resembles mother's milk, with the exception of the fats. We can, however, increase the volume taken by the child by 100-150 c.c. over that obtained by nursing, to overcome the deficiency in fat.

A simpler way would be, during the second and third months, to give the one-half dilution, which is as follows:—

	Proteids.	Fats.	Sugar.	Ash.
50 parts milk	1.35	1.8	2.2	0.35
50 parts 10 per cent. sugar solution			5.0	
	1.35	1.8	7.2	0.35

This mixture shows an increase of proteids and sugar over mother's milk, but a deficiency in fats, and can be given in the same volume as mother's milk of the same period. Finally, from the third or fourth month we give the two-thirds mixture; that is, two-thirds milk and one-third water in 100 parts.

	Proteids.	Fats.	Sugar.	Ash.
66 parts milk	1.8	2.4	3.0	0.47
33 parts 12 per cent. sugar solution			4.0	
	1.8	2.4	7.0	0.47

This mixture contains very nearly the same amount of non-nitrogenous substances as mother's milk, but the nitrogenous substances and salts are double the amount in mother's milk. Experience shows, however, that children of four months or over can easily take this mixture, providing the daily quantity given does not exceed 1 litre from the fourth month on.

It cannot be emphasized enough that we should always know the daily quantity given. This point is frequently overlooked when prescribing the mixture. With the above mixtures one can artificially feed and raise a normal healthy infant, and thousands are being thus raised to-day. This one point will have to be emphasized again and again: that cow's milk and sugar of milk will have to be bacterially clean if we wish to have any success in artificial feeding.

DR. EFFA V. DAVIS, in speaking of Heubner's method, said she thought while the scheme might figure out from a mathematical point of view it did not take into consideration the individuality of babies, which is as pronounced as in adults, and must be reckoned with.

In Chicago one has an opportunity to study the different nationalities, and after fifteen years of observation it is her opinion that the American baby is about the most difficult to feed artificially with success, and that the babies of the Jewish race are the easiest, as they show a sturdy digestive power beyond the average. She thinks no process has been presented that will prove satisfactory to all babies; and while Heubner's method may have succeeded in Germany she thinks it will not be a universal success here—in fact, it was a similar method she began to use when first out of college and gave up for a more satisfactory modification by percentages.

DR. J. C. COOK said his experience had been so limited with the method in question that he did not feel entitled to say much about it either as commendation or criticism. When he recalls the trouble of all sorts with the percentages of proteids, fats and carbohydrates, with the addition of oatmeal and other preparations, it does not seem possible that a system so simple as this could be adopted as a routine in feeding American babies.

In reference to using sterilized milk, the experience of the American pediatricists, and also the statistics, are so much against

sterilization, that there would be objection to this method in this country, at least.

He did not know how much scurvy they have in Germany; he did not remember seeing many cases; but if they have the same tendency to scorbutic troubles there as here, then he thought this objection would be valid. If Dr. Lackner will adopt this method and feed a thousand babies on it, all would be glad to benefit by his experience, as the method is certainly simple. If clinical experience proves its value in this country as it has in Germany, all will be under great obligation to Dr. Heubner, and to Dr. Lackner for presenting it to us.

DR. LACKNER said he did not know why babies in this country should be different from babies in the old country, but assured the Society that he had Irish, German, Italian and Jewish as well as American babies on this mixture; in fact, they were all American babies with the parentage of the nationalities named. The avoidance of fat has been noticed. Fat seems to be the irritating substance.

In this method the capacity of the stomach is always to be considered. Sometimes one child will eat more than others. One should make a rule not to give more than 32 ounces in twenty-four hours. This is invariable.

In regard to sterilization, Dr. Lackner said that Heubner's clinic is the best conducted pediatric clinic in the world. Heubner has as an assistant a first-class pathological chemist. He has also a bacteriologist, and every child that enters the clinic is bacteriologically examined (blood, secretions, etc.), and all of the clinic is as thoroughly guarded as the patient itself. The mothers are made to report. The children are weighed frequently; the secretions are examined closely. For artificial feeding Heubner has tried all combinations and the different percentage feedings. There are some physicians, and a great many people, inclined to say that owing to the advances made in infant feeding the mother does not need to nurse her child. Heubner says that anyone that will give this advice to a mother who is capable of feeding her child commits a sin against the child. Artificial foods will bear no comparison whatever to cow's milk.

DR. MAY MICHAEL, in the absence of Dr. I. A. Abt, read his report of a

CASE OF UNRESOLVED PNEUMONIA AND BRONCHIECTASIS IN A CHILD SUFFERING FROM PSEUDOMUSCULAR DYSTROPHY.

The patient was a male child, delicate from birth. He had pneumonia at one year of age and scarlatina followed by some "kidney trouble" at four. On September 10, 1899, when he was five years old, he was admitted to the hospital with the diagnosis of progressive muscular atrophy. He was suffering from general weakness, bilateral ptosis, decreased knee jerks and typical leg climbing. He was dismissed October 20, 1899, somewhat improved.

In February, 1903, he had a second attack of pneumonia, chronic and unresolved in nature. On December 30th of the same year he was readmitted to the hospital on account of a cough with copious mucopurulent sputum, and pain in the neck and epigastrium with every paroxysm. There had been sleeplessness and general malaise for the previous eight days. Examination of the chest at this time showed relative dullness over the entire right side, more marked over an area at the apex and also between the vertebral column and the angle of scapula. In the latter area were increased tactile and vocal fremitus, amphoric breathing and large moist râles. These râles and prolonged expirations could be heard over the entire right side; expansion was very limited. Expansion on the left side was also limited. There was hyperresonance and accentuation of the expiratory sound over the entire left side.

The temperature varied from 98.2°F. to 101.8°F. for ten days, showing no regular curve, sometimes being higher in the morning, sometimes in the evening. The pulse ranged from 96 to 100 and the respirations from 24 to 32. The temperature then became normal. He was discharged February 3d. The cough was slight and caused no pain. There was greater power of expansion and the breathing was more vesicular in character, although still amphoric in the area near the angle of the right scapula.

He was again admitted October 10, 1904, with general malaise, coryza, hoarseness and a cough. The cough at the onset was hacking and dry, but had become loose and productive of a copious, greyish-yellow sputum. Coughing attacks occurred but once or twice a day.

Thoracic findings were very similar to those in the previous

attack. The nervous system showed the following: Bilateral paralytic ptosis, more marked on the left side; bilateral external ophthalmoplegia; pupils dilated, with slight reaction to light; the muscles supplied by the second and third branches of the facial nerve weak (more marked on left side); atrophy of upper part of pectoral muscles, also of posterior portion of left deltoid; muscles of both arms flabby and weak; reflexes of triceps barely obtainable; radial, ulnar and scapular reflexes absent; erector spinæ and abdominal muscles weak; abductors of thigh atrophied; extensor and flexor muscles of thigh weak; patellar reflex decreased on left, absent on right side; increased vasomotor irritability.

This pulmonary attack ran a course similar to the previous one and the child left the hospital January 15, 1905. Nine months later, October 18th, he was again admitted. He had been free from symptoms until five days before, when he was seized with a severe spasmodic cough with expectoration. This attack resembled the three previous ones, but the boy was weaker and suffered from anorexia and vomiting. He was restless and sleepless and complained frequently of headache.

October 27th (nine days after admittance) he complained of pain in the abdomen and head; breathing became labored and the pulse weak; there was inability to expectorate, and a marked cyanosis. He died October 27, 1905.

Postmortem was made one hour after death. The only important findings were in the lungs. The left pleural cavity had a few, the right many, fibrous adhesions. In the upper lobe of the left lung were a few small depressed areas with white moist fibrous covering. The apex and margins of the lobes were emphysematous. The cut surface showed widely dilated bronchi exuding a frothy mucus and there were numerous small areas of consolidation. In the right lung there was crepitation only in the marginal zones. The cut surface was mottled, dark grey; the bronchial orifices were widely dilated, especially in the middle lobe, and contained a frothy mucus. The middle lobe was almost wholly without crepitation and showed smooth, moist interstitial areas between the gaping bronchi. This lobe and some areas in other lobes had a consistency of rubber.

Anatomical Diagnosis.—Fibrous pleuritis, bilateral; fibroid pneumonia; marginal and compensatory emphysema, pulmonary edema, cylindroid bronchiectasis; muscular atrophy.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGAR.
DR. A. W. BINGHAM.

DR. HENRY HEIMAN.
DR. M. NICOLL, JR.

DR. G. R. PISEK.

PATHOLOGY.

Paterson, D. R.: Congenital Laryngeal Stridor. (*British Medical Journal*, November 24, 1906, p. 1,447.)

The difficulties of laryngoscopic examination in children have caused a difference of opinion upon the appearance of the larynx and the mechanism of the stridor in this affection.

Five cases, varying in age from eight months to two years, were examined under chloroform by means of the Kilian tube-spatula. The curving of the epiglottis was noted in varying degree and the approximation of the aryepiglottic folds, but the most striking appearance was the extraordinary excursion of the posterior wall of the larynx. With each inspiration the soft parts on the cricoid, including the arytenoids and the interarytenoid fold, were drawn downward and forward, and it was the vibration of this section of the laryngeal entrance which gave rise to the noisy stridor. If this posterior wall was held back by a probe, the air passed in easily and without stridor. There was no spasm or paralysis of the vocal cords, and the trachea was normal.

A. W. BINGHAM.

Breton, M., and Petit, Georges: On the Permeability of the Mesenteric Nodes in Young Guinea Pigs, Made Tuberculous by Way of the Digestive Tract. (*L'Écho Médical du Nord*, February 24, 1907, p. 90.)

A dozen guinea pigs, eight to ten days old, were inoculated with tuberculosis by the introduction of virulent bacilli by means of the esophageal tube. They were then carefully isolated, protected from dust, and fed on washed food. Thirty days later, six of them received small amounts of india ink in the stomach and six others the same injected into the peritoneal cavity, and twenty-four hours later were killed.

The usual result of tuberculous infection of the digestive tract was found, *i.e.*, apparently healthy intestinal wall, tuberculosis of the mesenteric nodes and of the tracheo-bronchial nodes.

The retrosternal and retromammary were not involved in

those cases inoculated by way of the digestive tract, but in those inoculated by way of the peritoneum this group of nodes was the first to be affected. Pulmonary anthracosis was shown in these experiments to be rapid and extensive in the first group of cases and absent in the second. The authors conclude: (1) that it is readily produced by way of the digestive tract in young guinea pigs, previously rendered tuberculous through the same channel; (2) that the tuberculous mesenteric nodes act like broken filters and do not retain foreign bodies; (3) that these experiments may explain the frequency of pulmonary anthracosis in tuberculous adults. The authors ask if it is not possible to account for the great frequency of various pulmonary lesions in the first and second infancy, due to the streptococcus, pneumococcus and colon bacillus, by assuming a damaged condition of mesenteric nodes due to tuberculosis.

M. NICOLL, JR.

MEDICINE.

Ross, N. B.: Case of Unusually Low Temperature Following Status Epilepticus. (*American Medicine*, October, 1906, p. 399.)

The patient was a boy ten years old, an inmate of the Craig Colony. He came from an epileptic family and had had spasms from his first year. During his last illness, which lasted about a week, the temperature at first rose to 103° F. Two days before death it began to be subnormal. Six hours before death it was 86° F., and two and a half hours before it was 81° F.

LOUIS C. AGER.

Hecht, D'Orsay: Hysteria in Children. (*The Journal of the American Medical Association*, February 23, 1907, p. 670.)

To dissipate misapprehensions, to show that hysteria occurs frequently in early life, and to emphasize its most characteristic phases, is the author's object. He says that hysteria most frequently develops between six and puberty; that heredity is the monster predisposing agent. The so-called stigmata and accidents of adult hysteria are not to be waited for before mentioning the diagnosis.

Juvenile hysteria in its objective manifestations is chiefly monosymptomatic. Sensory disturbances are rarely noted in

children. Hysterical motor agitation is expressed in the form of choreic movements. In hysteria, consciousness is never altogether lost.

The prognosis, he reminds us, is better in children than in adults. Early and prompt cure depends on an early and positive diagnosis. Under the treatment the "method of disregard" and the "method of surprise" are spoken of in conjunction with the all-important isolation.

G. R. PISEK.

SURGERY.

Carpenter, George: Notes on a Case of Acute Osteomyelitis of the Spine in an Infant. (*British Journal of Children's Diseases*, August, 1906, p. 348.)

There are several varieties of this rare disease in children, varying from simple periostitis with complete recovery to severe, and even fatal, cases like the one reported. The case was briefly as follows:—

Female, fifteen months, breast-fed, previously healthy, sick two weeks before entering hospital. No history of tuberculosis in the family. On admission, the child had moderate fever, seemed very ill, and there were physical signs of effusion in the pleura. The abdomen was swollen; in the left loin there was a tender, fluctuating swelling, dull on percussion. The child died six days after admission.

The Postmortem Examination.—Two pints of purulent fluid in left pleural cavity; right pleura thickened; left lung collapsed, and its base was adherent to the diaphragm. The heart was normal. In front of the first, second and third lumbar vertebræ there was a pus cavity, separating the anterior common ligament from the vertebræ and eroding the surface of the left kidney. It also communicated through the diaphragm with the left pleural cavity. The first lumbar intervertebral disc was completely destroyed and the vertebræ eroded. Microscopical examination of the pus showed streptococci and diplococci, but no tubercle bacilli could be found. [Although a streptococcic osteitis is quite possible in this location as in any other, there is not enough evidence in this report to exclude the possibility of a tubercular process—which is the logical clinical diagnosis. The brief statement that no tuber-

cle bacilli could be found microscopically is not convincing. A tubercular process at this age may be very acute and the mother's history is not to be relied upon.]

LOUIS C. AGER.

HYGIENE AND THERAPEUTICS.

Strauch, August: Buttermilk as an Infant Food. (*Medical Record*, March 30, 1907, p. 515.)

Buttermilk feeding is recommended by the author to be used in cases where there is insufficiency of fat and of albumin digestion in infantile atrophy; in *dystrophia infantum*; in *allaitement mixte*, and in cases of sudden weaning. Also for premature infants it is available. The objections against a buttermilk *régime* are due to the fact that a buttermilk of standard quality is hard to obtain. The common commercial product is unfit for infant feeding. Conserves of buttermilk are prepared in Germany, and are recommended as worthy of trial.

G. R. PISEK.

Walker, D. Harold: Aural and Nasal Examinations of School Children. (*Boston Medical and Surgical Journal*, December 13, 1906, p. 709.)

The author calls attention to the importance of the thorough examination of the hearing of all school children. He examined 289 children at the Pierce School in Brookline, Mass., and found that there is a close relationship between diminished hearing and poor scholarship. Thus, only 17 per cent. of the pupils that received the grade of excellent had poor hearing, while 20 per cent. of those marked good; 30 per cent. of those marked fair; 52 per cent. of those marked unsatisfactory, and 42 per cent. of those marked poor, had diminished hearing. He also found that 23 per cent. of the pupils had hearing only two-thirds of the normal; 30 per cent. had adenoids; 21 per cent., hypertrophied tonsils; 5 per cent. showed the result of chronic suppuration of the middle ear, and 1 per cent. had ear discharge. The author strongly recommends the thorough examination of the sight and hearing of all school children in order to detect and remedy the frequent defects which are present.

HENRY HEIMAN.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

AUGUST, 1907.

[No. 8.

Original Communications.

PSEUDOMASTURBATION IN INFANTS.*

BY B. K. RACHFORD, M.D.,
Cincinnati, Ohio.

Definition.—Pseudomasturbation is a syndrome occurring in infancy and early childhood, which has been described in medical literature under the titles "Thigh Friction" and "Infantile Masturbation." It is commonly accomplished with the child lying on its back; the thighs are flexed, crossed and pressed tightly together, closely embracing the external genitalia; in this position the infant makes a wriggling, or up and down body movement and rubs its thighs together. In other instances the genitalia are rubbed with the hands or feet or against some piece of furniture or other foreign object. These movements are apparently attended by a pleasurable excitement; the face is flushed and there is a marked increase in the general nervous tension. Following this act, which continues for a few minutes only, there is general relaxation, accompanied by mild perspiration, quiet contentment and in some instances sleep.

ETIOLOGY.

Age is the most important etiological factor. It is necessary to the interpretation of the etiological factors involved in pseudomasturbation that one should understand certain embryological

NOTE.—The table of cases upon which this paper is founded contains my own cases and a brief synopsis of the cases which I have received from the members of this Society in response to a circular letter which I addressed to them. I have also quoted freely from my chapter on "Thigh Friction" in "The Neurotic Disorders of Childhood" (E. B. Treat & Co., Publishers, New York). I am also indebted to Dr. S. Stark for suggestions concerning the embryology of the female genitalia, and to Dr. H. Woodward for the drawings exhibited.

* Presidential address delivered before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 8, 1907.

facts pertaining to the development of the genital organs. In the female, the urinary bladder, the rectum and the external genitalia, including the clitoris, the labia majora and labia minora, are all derived from the same membrane, viz., the mesoderm of the allantois and cloaca. And in the male analogous structures are derived from the same source.

The internal genital organs, including ovaries, uterus and vagina in the female and analogous structures in the male, are derived from the Müllerian ducts and the genital ridges. And although these are of mesodermic origin they are developed quite independently of that portion of the mesoderm which is being transformed into the urinary bladder, the rectum and the external genitalia. The Müllerian ducts and genital ridges make their appearance later than the allantois and are united with it.

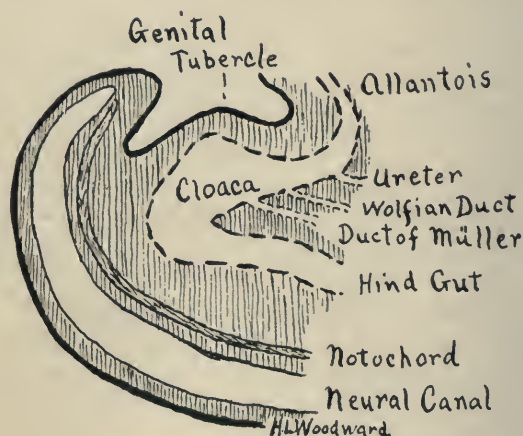


FIG. I. EMBRYO OF 10 MM. (ABOUT 5 WEEKS).

Key: ——— Ectodermic Tissue; - - - - Entodermic Tissue;
 Mesodermic Tubes; shading = Mesodermic Tissue.

The accompanying drawings illustrate the common origin of the urinary bladder, the rectum and the external genitalia, and also show the entirely different origin of the internal genital organs. The union between these groups of organs takes place about the fifth week of embryonic life, but there is a marked difference throughout embryonic life in their anatomical and physiological development.

The bladder, rectum and external genitalia are rapidly developed, so that at birth the rectum and bladder have reached a fair

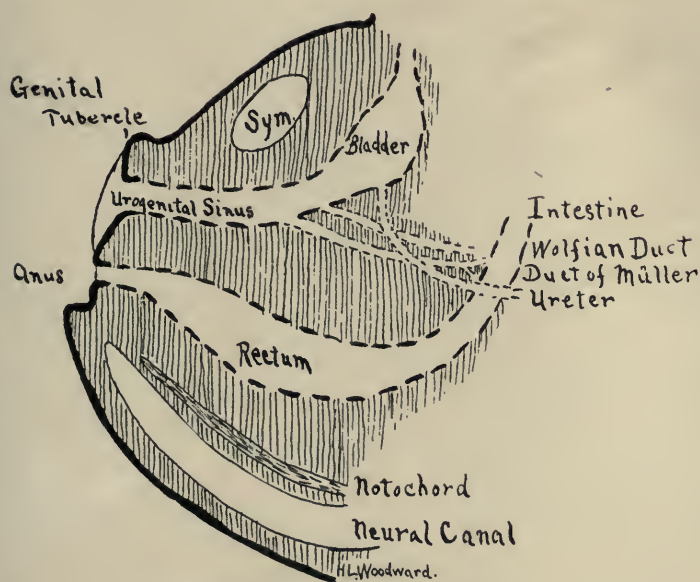


FIG. II. EMBRYO OF 25 MM. (ABOUT 9 WEEKS).

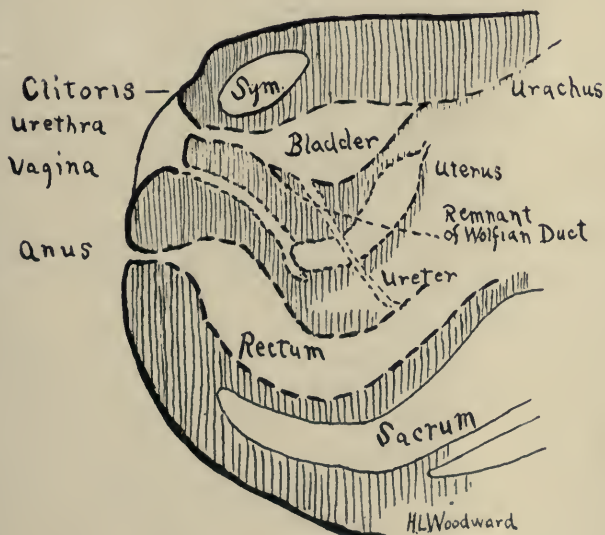


FIG. III. CHILD AT BIRTH.

state of physiological competency ; and the external genitalia, being developed from the same structures, have been carried along in their evolution until they also have reached a considerable degree of development ; the clitoris itself is almost as large and as sensitive as it becomes later in life. This, however, is not true of the internal organs of generation, which at birth are in a very incomplete state of anatomical and physiological development ; and the rudimentary condition of these organs, according to Otto Küstner, continues in the girl until she is ten years of age.* He says : "From birth until the beginning of puberty there is no real change in the genital tract of the girl. The uterus and vagina during this period undergo no development."

The close anatomical and physiological relationship existing between the bladder, rectum and external genitalia of the infant is still further shown in the nerve supply of these organs, which is practically derived from the same source, viz., the third, fourth and fifth sacral nerves and the mesenteric, sacral and hypogastric plexuses of the sympathetic.

The close anatomical and physiological relationship which exists between the bladder, urethra, rectum and external genital organs of the infant is the most important explanation of the fact that the external genital organs of the infant, a few months after birth, are capable of responding to reflex excitation originating in any of the above-named parts. And the manner in which this excitation finds expression is so like a miniature syndrome of true masturbation that one must conclude that this portion of the infantile genital system, which is later in life to come in closer touch with the fully developed internal sexual organs, must even at this early date in its development have impressed upon it the peculiar physiological function which makes it respond to reflex excitation by mimicking the sexual orgasm.

The above explanation is fully in accord with the principles underlying the development of physiological functions. They all go through various stages of evolution in the embryo, and at birth many of the most important functions are developed to a state of physiological competency. This is not true, however, of the functions of the internal sexual and reproductive organs, which organs, as previously stated, are at this time both anatomically and physiologically in a very low state of development. So low,

* *Lehrbuch der Gynäkologie*, 1904.

in fact, that they are as yet not endowed with physiological functions. In the infant, therefore, while we may have produced by reflex excitation of the external genitalia a syndrome which mimics the syndrome of true masturbation, we cannot have the fully developed orgasm, or a syndrome that equals true masturbation in the profundity of its sensations, or in the injurious effects it produces on the general nervous system.

In the child, after ten years of age, the internal sexual organs undergo rapid anatomical and physiological development, and during these years of development the intense feelings which accompany the sexual act may be evoked by reflex excitation. This is the beginning of true masturbation. I do not mean to say, however, that true masturbation may not occur in certain children before they are ten years of age. Heredity and long-continued reflex excitation may cause a premature development of the internal sexual organs, carrying with this development a sexual precocity which may make true masturbation a possibility in some children at a much earlier age.

Pseudomasturbation, however, occurs as early as the fourth month, and the average age of onset of this neurosis, in the cases presented in my table, is sixteen months.

Sex.—In comparing the pseudomasturbation of infants with true masturbation in later life, one fact stands out very prominently, and that is that the vast majority of cases of pseudomasturbation occur in female infants, and the majority of the cases of true masturbation occur in male children. I have seen only 1 case of pseudomasturbation in the male infant; and of the 52 cases which I have collected, 48 occurred in female and 4 in male infants.

Why are male infants comparatively immune from this neurosis, which is so common in female infants? In answering this question it is, of course, absurd to assume sexual precocity in the female infant. An inherited neurotic tendency on the part of female infants seems an equally inefficient explanation. In this dilemma one naturally seeks an answer to this question in the comparative exposure of male and female infants to reflex excitation of the nervous mechanism involved, and here, perhaps, we have the solution of the problem. It is a notable fact that the genitalia of the female infant are not as carefully looked after by nurse and physician as they are in the male child. Preputial

abnormalities in the male infant are almost always noted, while irritations about the clitoris, vulva and vagina are commonly overlooked. Acids and other irritating substances in the urine and feces, which are such potent factors of irritation in the female infant, are for anatomical reasons of comparatively little moment in the male. Pinworms, fissure in ano and other rectal abnormalities, by reason of the open proximity of the female genitalia, are much more liable to irritate the genital organs of this sex than those of the male. One may infer, therefore, that the much greater exposure of the genital organs of the female infant to long-continued reflex excitation is the most important reason for the great preponderance of pseudomasturbation in this sex. It may here also be noted that the clitoris is more exposed to external irritants in infancy than it is in childhood, because of the comparative lack of development of the labia which later enfold it.

Habit.—The habit which is formed by the practice of pseudomasturbation becomes after a time one of its most potent etiological factors.

No such sensations can be produced by exciting any other nervous mechanism in the body. In the first instance the excitation may be purely accidental or it may be caused by some local irritation. But after a time the frequent excitation of this nervous mechanism makes it more irritable and more easily excited, so that very slight reflex excitation is capable of producing a paroxysm of pseudomasturbation. When this occurs the habit may be said to be engrafted upon the nervous system, and from this time on the most potent factor in producing a paroxysm is the habit, formed by these little patients, which impels them to practice pseudomasturbation with little or no reflex factor to suggest such action. In this manner "the habit" becomes the most potent of all the factors of pseudomasturbation, and for this reason we may class it among the habit neuroses.

Environment may be an important etiological factor of pseudomasturbation.

In the older child, environment may act by throwing children together, offering the opportunity for imitation. It may also act by surrounding the child with an atmosphere of immorality and vice which offers no restraining influence upon the development of this habit.

In the infant, environment may act by producing bad hygienic surroundings, which may mean uncleanness and lack of care of the genital organs, with increased local excitation, or it may mean malnutrition and other causes of general nervous irritability.

Under this heading should also be noted the fact that unscrupulous nurses sometimes teach infants the habit of pseudomasturbation as a means of quieting their fretfulness.

Heredity is an all-important predisposing factor. In fully three-fourths of the cases there is a distinct neurotic inheritance, which means that these infants have an unstable, poorly developed, irritable and easily excited nervous system under weak inhibitory control, predisposing them to this and other neuroses. In infants suffering from hereditary neuroses the reflex causes of pseudomasturbation may be very slight; so slight, in fact, as to escape observation.

A gouty inheritance may also predispose to this condition by producing in infants a tendency to periodic attacks of acid urine. I have had under observation a number of such cases where there was a return of the pseudomasturbation with every return of the attacks of acid urine from which these infants suffered.

Illness in infants suffering from pseudomasturbation influences very much the severity and frequency of the attacks. In children convalescing from this disorder, an attack of enteritis, influenza or any other acute disease which causes a rapid deterioration in general health, will produce a return of the habit, which can again be relieved only by complete convalescence from the intercurrent disease.

Malnutrition in infants from whatever cause, acute or chronic, greatly increases the excitability of the young nervous system, and in this way increases the potency for evil of all reflex factors producing neurotic disorders. In this indirect way malnutrition may be a powerful factor in starting and in prolonging the habit of pseudomasturbation in infancy. It may further interfere with the normal development and growing stability of the infantile nervous system, and in this way nullify an important factor in the cure of these cases. In nearly three-fourths of the cases here reported the general health was poor.

Social Condition.—It is an interesting fact that the social en-

vironment of the infant is a predisposing factor of pseudomasturbation. Of the cases here reported, in 28 the social condition was good; in 6, poor; in 13, bad. The explanation of this is not altogether clear. It may be that children born under good social conditions are more likely to have a gouty inheritance, and therefore suffer more from constipation and acid urine, which are important factors of this neurosis. The children of the rich are also, perhaps, more neurotic and are surrounded by a social order which excites their young nervous systems. And, on the other hand, it would appear that among well-to-do people the condition is perhaps more readily recognized and therefore a greater percentage of cases of this class comes under the observation of physicians.

Direct Causes.—Irritation of the nervous mechanism which controls the sexual organs is the all-important exciting factor in the development of pseudomasturbation in infancy. The site of this irritation in the vast majority of cases is in the genito-urinary organs. Irritation and disease of the rectum and lower part of the large intestine may also be direct causes of this condition.

In 1876, in the *American Journal of Obstetrics*, Jacobi says: "All causes resulting in direct or indirect irritation of the nerves of the genito-urinary organs are apt to give rise to masturbation in the young, . . . the intimate correlation of the branches of the pudendal plexus explains why abnormal conditions of the lower portions of the intestinal tract are among the frequent causes of genito-urinary irritations." This masterful clinician at this early date gave to the world the clinical picture of this disease, and outlined the etiology and treatment of this condition as it is taught to-day. His more recent communications have but confirmed his earlier views. But, notwithstanding the teachings of Jacobi and others, I am convinced that the average practitioner commonly overlooks the reflex factors in these cases, and that a casual examination reporting the genito-urinary organs as normal is often made when there is some abnormality of the clitoris, a slight vaginal catarrh, an acid condition of the urine, or some other local cause of reflex irritation, which is an important factor in producing the condition. In the cases here reported, reflex factors were present in three-fourths of the cases, and this proportion is perhaps too low. In one-half of the cases reported there was some abnormal condition of the genitalia, such as ad-

herent clitoris with irritation of the preputial hood, vulvovaginitis, congestion, swelling, irritation, etc. It should be remembered, however, as Jacobi has pointed out, "that the changes found in the genital organs in infants or children who masturbate may not be the cause, but frequently are the result, of the manipulation." But whether originally the genital irritation was a cause or an effect it matters little to the clinician, as the condition itself now aggravates and prolongs the habit, and must, therefore, receive medical treatment.

An acid condition of the urine (which irritates especially the female genitalia) occurs in more than one-third of the cases published in the table. This cause of irritation may be periodic, or, rather, it may recur at intervals in infants of the gouty or bilious type. This recurrence of acid urine, with the local irritation which it produces, may explain many of the cases which have a tendency to periodic relapses. In this group of cases the condition may be aggravated by a diet rich in meat-juice and meat-broths, which form so large a part of the diet of some infants. Constipation is reported as being a factor in 6 of the cases in the table, and there can be no doubt but that it is one of the direct causes of pseudomasturbation in infancy. Colitis, with the irritation which it produces in and above the rectum, and diarrhea of any kind, by reason of the irritating influence of the discharges on the genitalia, may be important factors in producing this condition. Diseases of the rectum, pinworms, tight and irritating clothing, uncleanness and eczema of the labia, are among other causes.

In the male infant, adherent prepuce, phimosis, balanitis and all conditions which may produce genito-urinary irritation may act as direct causes.

PROGNOSIS.

The prognosis is very good. Of the 52 cases presented in my table, 25 were cured, 7 were improving under treatment, 17 received no treatment, and only 2 cases are reported in which the treatment was of "no avail," and one of these was a case of true masturbation beginning at four years and coming under treatment when seven years of age. The other case was two and one-half years of age and failed to respond to treatment, but died shortly afterward.

From an analysis of these cases, as well as from my own experience, I am convinced that pseudomasturbation occurring in

infants under two years of age will, in time, get well under almost any intelligent form of treatment. The tendency in this disease is to spontaneous recovery, and the average length of time required to bring about this result is, as shown by my table, nineteen months.

The disease is a habit neurosis, and time, with a normal development of the nervous system which tends to stability and greater inhibitory control, is the most important factor in the cure of the worst cases.

There is almost no connection between pseudomasturbation in infancy and true masturbation in later life. It is possible, however, that a badly neglected case of pseudomasturbation occurring in a strongly neurotic infant may continue until it becomes one of true masturbation in the child. I have never seen such a case and none is reported in my table, but Jacobi and others mention these cases in their writings.

There is, I believe, no relationship between pseudomasturbation and epilepsy. The two conditions may coexist, and one can understand that the neurotic conditions which produce or underlie epilepsy may predispose to pseudomasturbation, but surely pseudomasturbation as here differentiated from true masturbation cannot be classed among the causes of epilepsy. I have never seen these diseases coexist, and no such cases are reported in my table. West, Holt, Strasser and others have seen these two neuroses in the same infant.

TREATMENT.

In the treatment of pseudomasturbation, as in the treatment of all habit neuroses, it is imperative that the habit be interrupted as soon as possible. The importance of this step in the treatment cannot be overestimated. The habit, whatever may have been its original exciting causes, has been engrafted upon the nervous system, and an interruption breaks into and helps destroy the habit, and in this way makes for the permanent cure of the affection. The accomplishment of this purpose, in some cases, is a matter of great difficulty. In the vast majority of cases, however, it is a comparatively easy matter.

As this act is performed, as a rule, while the infant is lying down, and commonly when it awakens from a sleep, and when the parts are more or less irritated by the soiled diaper, it is im-

perative that a careful nurse, by constant watching, shall be present forcibly to prevent the act by taking the child up, changing the diaper, cleansing the parts and dusting them with a soothing powder. The watchfulness of the nurse should continue throughout the waking hours of the child, so as to keep the parts always clean, dry and free from irritating discharges. The child should be kept in a sitting posture as much of the time as possible, and even when taken for an outing should, if old enough, be carried about in a go-cart in preference to the ordinary baby carriage. The object of this is to keep the child in the position which least tempts it to practice the act. The nurse should be directed forcibly to interfere at all times to prevent the accomplishment of the act.

In children over two years of age mild punishment is sometimes very effective, and the child, when old enough, should be given to understand that it will be rewarded if it abstains from the habit. Moral suasion should be practiced with older children. It is evident that the above treatment can only successfully be carried out by an ever-watchful, patient, judicious nurse.

In the more severe cases forcible restraint during sleep may be necessary, as the infant cannot be watched constantly during the long hours of the night, and it may, on waking up in the night, practice this habit.

Forcible restraint may be practiced in many ways. No special device is suitable to all cases. But if the physician is sufficiently impressed with the necessity for this method of treatment the particular mechanical device by which the end is to be accomplished may be left to his ingenuity. If the infant sleeps in pajamas the heels of this garment may be fastened by safety-pins to the mattress in such a manner as to hold the legs apart, and prevent the flexion of the thighs; at the same time the child's body is prevented from slipping down in the bed by a ribbon stretched from the back of the pajamas to the head of the bed. In younger children a large diaper may be folded, as suggested by Kerley, so as to prevent the thighs being approximated. Many writers have recommended heavy mechanical devices resembling fracture frames, into which the child is tied when it is put to bed. The profound sleep of the young child lends itself to this mode of treatment and the patient quickly becomes accustomed even to such cumbersome appliances as double thigh splints with a separating foot-board. It must indeed, however, be a very severe case to justify this form of apparatus.

When one has settled upon a plan for interrupting the habit, he should next turn his attention to the removal of all local reflex causes of irritation. In the male infant phimosis and preputial adhesions should be treated, and in the female infant the preputial hood should be separated from the clitoris; vulvovaginitis and all irritations of the vaginal orifice should be treated. Pinworms, diseases of the rectum, local eczema and, in fact, all abnormalities of the rectum and genito-urinary organs should be removed and the child's clothing should be carefully arranged so as not to produce local irritation.

Too much stress cannot be laid upon the importance of removing all possible sources of local irritation of the nervous mechanism which controls the genital organs, as the reflex factor is not uncommonly the most important not only in starting but continuing the habit of pseudomasturbation.

I wish, however, to call special attention to increased acidity of the urine as a potent reflex factor in many of these cases. I believe it is the most important of all reflex factors. It was present in one-third of the cases reported in my table, and I believe that careful examination will show its existence in even a larger percentage than this. This condition may be treated by benzoate of soda and tincture of belladonna put up in some palatable non-irritating vehicle. The alkali and the belladonna, the latter in small doses, should be given over a long period of time, when there is any tendency to continuous or periodic acidity of the urine.

General Treatment.—Many cases, especially those over two years of age, are benefited by bromid of potash and belladonna given at bedtime. This treatment is especially applicable in those cases where the habit is practiced during the night.

An atmosphere of quiet and rest must if possible at all times surround the child. The importance of this injunction is as great in this as in the treatment of any other neurosis.

By the treatment above outlined it is possible in practically every case to control the habit, but it must be remembered that this treatment must with more or less rigor, depending upon the severity of the case, be kept up not only for months, but sometimes for two, three, or even four years. Where the treatment, however, is carefully looked after one may count upon a permanent cure in the great majority of cases within one or two

years. In those that are less carefully looked after four or five years may be necessary to accomplish a cure. One must recognize, therefore, that when the above treatment has been put into operation, and the habit controlled, the patient has been placed under conditions where time, by strengthening the stability and inhibitory control of the nervous system, will accomplish a cure. It therefore becomes important at this stage of the treatment to guard carefully the child's general nutrition, treating any special form of malnutrition that may exist and securing normal development of the child by careful diet and proper hygienic measures, including an outdoor life. Codliver-oil, iron, arsenic, and other tonics may enter into the treatment. It is important that the child should be guarded against constipation and all gastrointestinal disturbances, as attacks of this kind almost always cause a recurrence of the habit in an apparently convalescent child.

The daily bath, followed by a cold douche, as will be seen in the table of cases, has been used with success.

TABLE OF CASES.

Case I. Reported by B. K. Rachford. Female, age 1 year.

REMARKS.—Parents are very neurotic and intellectual. Patient is very constipated, has feeble digestion and suffers much from intestinal intoxication. She is pale, poorly developed, excessively nervous and mentally precocious. Social condition very good, lives in luxury. Attacks of thigh friction were always increased in number and severity by any illness of patient. During the years she was under observation the intense general nervous excitability of child was very noticeable and her nutrition remained below par in spite of our best efforts.

SYMPTOMS.—Genitalia red and swollen at times, thought to be due to the thigh friction. Urine was normal. Thigh friction, intense excitement, redness of face, complete relaxation, act performed 8 or 10 times a day, always while lying down and especially when she would awaken from a sleep. Child intensely nervous at all times, slept poorly; when 2½ years of age developed a well-marked *facial* habit-spasm, which she contracted, by imitation, from an older child. Patient responded fairly well to treatment, the history of the case being marked by long periods of apparent cure—then relapses from some slight ill-health and now at six years of age child is apparently well and has had no attacks for more than one year.

TREATMENT.—Careful watching to prevent attacks, especially on awakening from nap. Child during waking hours was given outings in go-cart, so as to maintain sitting position (Holt), as act is commonly performed while lying down. Outdoor life, careful feeding, treatment of constipation and intestinal condition, avoiding all nervous strain and mental stimulation. Sedative ointment to genitalia. Iron and arsenic as tonics. Bromids at times. Codliver oil was taken for a long time with good results. Occasional relapses until child was nearly five years of age. Now well.

Case II. Reported by B. K. Rachford. Female, age 18 months.

REMARKS.—Family history: Father gouty and neurotic. Mother has suffered from migraine and is now a neurasthenic. Patient had scurvy when eight months of age, and at eighteen months was a

SYMPTOMS.—Genitalia normal except redness and swelling which at times resulted from acid urine and from the thigh friction. Urine acid at all times and periodically very acid, scant and high colored, no albumin or sugar. At such times the attacks were much

TREATMENT.—Constant watching on part of good nurses to prevent an attack. Locally a soothing ointment when necessary. Outdoor life and careful feeding. Protection from nervous excitement and mental

very nervous child. Suffered from periodic attacks of acid urine, and at such times the urine burned and irritated the genitalia. Suffered also from constipation. Social condition the best.

worse. Constipation and any illness made the attacks worse. Thigh friction, red face, excitement, perspiration, and relaxation. Attacks occurred once or twice a day and commonly on awakening from morning nap. Attacks occurred when lying down. Under treatment the habit was always quickly controlled—so that within a week or ten days she would seem well except for the general nervous irritability which remained. Relapses would occur from acid urine and illness. This tendency to relapse gradually grew less and disappeared when she was four years of age.

stimulation. Benzoate of soda in elixir of pepsin was taken over long periods of time to prevent recurring attacks of acid urine. Constipation was relieved. Child steadily improved in every way and at long intervals for a number of years there would be slight returns of attacks brought on by acid urine. Child is now ten years, and is perfectly well and has had no attack since four years of age. During the whole time since her first attack she has been under careful supervision.

Case III. Reported by B. K. Rachford. Female, age 15 months.

REMARKS.—Family history: Good on father's side; on mother's, neurotic. Patient fat and flabby. Had attacks of recurrent vomiting and was excessively nervous. Suffered from attacks of acid urine. These attacks and her recurrent vomiting attacks always aggravated attacks of thigh friction. Social condition very good. Was 2½ years of age when I saw her and put her under treatment.

SYMPTOMS.—Genitalia normal except for redness and slight swelling which occurred at times as result of habit, and of acid urine. Urine, very acid and concentrated, at times produced irritation of genitalia. Thigh friction, face red, excited, followed by perspiration and irritability. One attack each day after morning nap, and after attack passes urine which seems to irritate genitalia. The mother had little trouble in preventing these attacks when urine was normal and child was in good physical condition. Following attacks of Recurrent Vomiting no amount of watchfulness, punishment or persuasion would prevent these attacks.

TREATMENT.—If mother watched child and picked her up as soon as she awakened and anointed the vulva with vaseline the attack was prevented. This made the child furious and she fought to prevent being taken up. By these tactics and by punishment the mother often interrupted these attacks. I advised the above treatment continued and gave sodium benzoate and looked after diet and nutrition. Treated Recurrent Vomiting. Under this treatment child got well in three months and remained so.

Case IV. Reported by B. K. Rachford. Female, age 6 months.

REMARKS.—Father a confirmed alcoholic. Mother intensely neurotic and had some arthritic disease which confined her to a hospital. Child had been badly neglected. Social condition poor. Patient was anemic and nutrition not good, was constipated and had been living under very bad hygienic surroundings. Child fell into hands of an aunt who gave her proper care and brought her to me for treatment.

SYMPTOMS.—Genitalia very much swollen and inflamed. Urine normal. Thigh friction, rocked, got red in face, excited, perspired, and sometimes slept for five or ten minutes, and at other times was irritable. Four or more attacks in twenty-four hours. Her aunt said that when constipated she was worse. She was three years old when brought for treatment. She heard me say attacks would probably occur when she was sitting up, and later told her aunt she could "rock" while sitting up.

TREATMENT.—Force used to stop attacks. Mild punishment and bribery used to prevent attacks. Soothing ointments to genitalia. Bromid of potash and belladonna. Genitalia rapidly became normal and after a few relapses due to constipation and excitement she was permanently relieved. Cured in four months.

Case V. Reported by B. K. Rachford. Female, age 2 years.

REMARKS.—Family history neurotic, one sister epileptic. General health fair. Patient constipated, and this seemed related to attacks. Social condition good.

SYMPTOMS.—Genitalia red and irritated, especially after attacks; no disease. Urine normal. Thigh friction and rubbing against furniture. Worse when constipated, then two or three times in twenty-four hours. Periods when it does not occur at all.

TREATMENT.—Treatment of constipation: Outdoor life; careful feeding. Sedative ointments. For a time a tendency to relapse when general health not good. Then a permanent cure after two years' treatment.

Case VI. Reported by B. K. Rachford. Female, age 1 year.

REMARKS.—Father gouty and mother neurasthenic. Patient was nervous, irritable and not well nourished. Social condition good, family lived in luxury.

SYMPTOMS.—Genitalia red, but not diseased. Urine very acid at times. Thigh friction, excitement, perspiration, relaxation, sleep. Attacks occurred after morning nap; after urination; sometimes two or three in a day. Acid urine irritated genitalia and caused attacks.

TREATMENT.—Sedative ointment. Sodium benzoate internally. Constant watching. Care as to general hygiene and feeding. Improvement, relapses, final recovery when three years of age.

Case VII. Reported by B. K. Rachford. Female, age 14 months.

REMARKS.—Tuberculous and neurotic family history. Mother hysterical. Patient a nervous, pale, precocious infant. Belongs to middle class.

SYMPTOMS.—Genitalia and urine normal. Thigh friction, intense excitement, perspiration, exhaustion, quiet. Attacks occurred three or four times a day and were aggravated by illness and general nervous excitability.

TREATMENT.—Mechanical restraint, watching, and as the child grew older (three years) reward and punishment. Attention to general health and protection from nervous excitement. Condition returned at times until child was four years old. Final recovery.

Case VIII. (True masturbation.) Reported by B. K. Rachford. Female, age 5½ years, now 7 years.

REMARKS.—Family history unknown, a charge of Good Shepherd Convent. Social condition the worst. Had gonococcus vaginitis. Protuberant forehead and high, arched palate.

SYMPTOMS.—Finger manipulation taught by other children. At 7½ years entered hospital. True orgasm. Masturbation two or three times a day. Hymen obliterated, parts unusually developed. Child seemed old, was secretive and would, perhaps, become a sexual degenerate.

TREATMENT.—Treatment of vaginitis and restraint improved condition. Passed out of observation when discharged from hospital.

Case IX. (True masturbation.) Reported by B. K. Rachford. Female, age 6 years, now 9 years.

REMARKS.—Hospital case. Ill history unknown. Entered for gonococcus vaginitis. Showed great sexual precocity.

SYMPTOMS.—Had masturbated. True orgasm for three (?) years. Was a confirmed masturbator and was taught by older children.

TREATMENT.—Cured of vaginitis. Masturbation controlled for a time while in hospital. Subsequent history unknown.

Case X. Reported by I. A. Abt. Female, age 8 months.

REMARKS.—Parents are cousins. Mother is neurotic and family belong to middle class. Patient's general health was good.

SYMPTOMS.—Urine and genitalia negative. Thigh friction followed by a marked lassitude or prostration. Number of attacks not known, but were very frequent.

TREATMENT.—Mechanical restraint. Bromids. Patient was reported cured, but she moved away and was lost sight of.

Case XI. Reported by I. A. Abt. Male, age 1 year.

REMARKS.—Mother had Basedow's disease. Maternal grandmother died of same disease. Maternal grandfather gouty and a potator. Patient had chronic gastrointestinal catarrh—occasional convulsive attacks. Social condition good; lived in luxury.

SYMPTOMS.—Genitalia normal, had been circumcised. Urine contained considerable quantity of urates. He lay on back in bed and raised thighs and rubbed them vigorously. Frequently lay on abdomen and kissed pillow before going through attack. Was nearly four years old and was not mentally defective. Attacks occurred principally before he took his naps.

TREATMENT.—Restraint by means of a specially made harness, which kept limbs apart. Has improved, but is not cured. Attacks are less frequent.

Case XII. Reported by A. H. Wentworth. Female, age 3 years.

REMARKS.—Family history good and patient in perfectly good health; was an only child of well-to-do people and was very active mentally.

SYMPTOMS.—Genitalia and urine normal. Attacks occurred only once in twenty-four hours, during morning nap. Thigh friction, flushing of face, perspiration, excitement and lassitude afterward.

TREATMENT.—Fixation of thighs by block fastened between legs gave temporary relief. Terrifying child with a severe punishment stopped the attacks and there has been no return for six months.

Case XIII. Reported by F. S. Churchill. Female, age 2 years.

REMARKS.—Family history neurotic. Patient's general health good. Social condition of family good.

SYMPTOMS.—Genitalia showed no organic disease, but urine was always acid and often contained excess of urates. One to three attacks in twenty-four hours. Attack produced by swinging on doors. Apparently pleasurable sensation, red face; tired and irritable afterward.

TREATMENT.—General hygiene; cold bathing; moral suasion. Habit stopped in three years.

Case XIV. Reported by J. L. Morse. Female, age 4 months.

REMARKS.—Family history neurotic. General health of patient good. Social condition very good.

SYMPTOMS.—Labia inflamed on internal surface, prepuce adherent to clitoris. Urine pale, 1010, acid, no albumin or sugar. Thigh friction, relaxation and perspiration. One attack in twenty-four hours.

TREATMENT.—Lost sight of at once.

Case XV. Reported by J. Ruhräh. Female, age 2½ years.

REMARKS.—Family history good, patient's general health fair. Social condition the very best.

SYMPTOMS.—Genitalia and urine normal. Patient rubbed thighs together and rolled about bed or floor until "orgasm" was produced; flushing followed by relaxation and sweating. Number of attacks one to three.

TREATMENT.—Constant watching, moral suasion. Results of treatment good. Occasional relapses for a few days. Now six years old.

Case XVI. Reported by P. J. Eaton. Female, age 2 years.

REMARKS.—Family history good, except mother, who was not well "balanced." Patient's general health fair and social condition good.

SYMPTOMS.—No opportunity to examine genitalia or urine. Practiced digital and thigh friction many times in twenty-four hours.

TREATMENT.—Do not know whether treatment was carried out. Results not known.

Case XVII. Reported by P. J. Eaton. Female, age 3 years.

REMARKS.—Mother a neurasthenic. Patient's general health good, but extremely nervous. Social condition very good.

SYMPTOMS.—Prepuce adherent to clitoris. Urine normal. Digital friction produced attacks. Several attacks in twenty-four hours. Always on going to bed in the morning.

TREATMENT.—Separation of adhesions. Restraint of hands. Moral suasion. Results good.

Case XVIII. Reported by J. Ruhräh. Female, age 2 years.

REMARKS.—Family history not known. General health good. Social condition very poor; a hospital case.

SYMPTOMS.—Genitalia and urine normal. Rubs thighs together or rubs genitalia with hands or against furniture. Repeated attacks in twenty-four hours.

TREATMENT.—Restraint in hospital. Lost sight of.

Case XIX. (American Journal of Obstetrics.) Reported by A. Jacobi. Female, age 9 months.

REMARKS.—Patient constipated and general health not very good. Social condition good. Many attacks in a day, and then none for two or three days. Constipation a factor.

SYMPTOMS.—Thigh friction, up and down movements, quick breathing, perspiration, sleep.

TREATMENT.—Diet and laxatives to cure constipation. Tonics, cod-liver oil. Watchfulness. Separation of thighs. Cure.

Case XX. Reported by J. P. C. Griffith. Female, age 8 months.

REMARKS.—Suffered from indigestion and deterioration of general health. A private case.

SYMPTOMS.—Urine normal, genitalia red, more so when attacks were frequent. Thigh friction, excitement, perspiration, exhaustion, very many attacks in twenty-four hours.

TREATMENT.—Cleanliness, washes, ointments, watchfulness. Treatment of indigestion, and as this got well and general health improved patient gradually got well.

Case XXI. Reported by J. P. C. Griffith. Female, age 1 year.

REMARKS.—Otherwise well. A clinic patient. Seen only once.

SYMPTOMS.—Vaginal orifice red, urination painful. Thigh friction, excitement, perspiration. "Several" attacks each day.

TREATMENT.—Results of treatment unknown.

Case XXII. Reported by A. Caillé. Female, age 9 months.

REMARKS.—Emotional and neurotic mother. Family history otherwise good. Pale and flabby child. Parents Hebrews and belong to working class.

SYMPTOMS.—Genitalia, rectum, and urine normal. Crossing legs, bending body, swaying motion and thigh friction, excitation and complete relaxation. Number of attacks four to twelve in twenty-four hours.

TREATMENT.—Now one year of age. Fresh air, daily bath and cold douche. Daily enema, careful feeding. Improving; still under treatment.

Case XXIII. Reported by C. W. Townsend. Female, age 1 year.

REMARKS.—Family history: General health good, but was easily excited and slept poorly, appetite fickle. Belongs to middle class.

SYMPTOMS.—Genitalia normal. Thigh friction or rubbing genitalia against chair. Several attacks in twenty-four hours.

TREATMENT.—Watching diet; seen once when three years old. Result not known.

Case XXIV. Reported by C. W. Townsend. Female, age 3½ years.

REMARKS.—Family history excellent. General health excellent. Middle class.

SYMPTOMS.—Rubbing genitalia on chair or box. Genitalia normal. Three to five attacks in twenty-four hours.

TREATMENT.—Seen at 5½ years. Watching to break up habit. Habit stopped.

Case XXV. Reported by C. W. Townsend. Female, age 4 years.

REMARKS.—Mother died of phthisis. General condition fair. Middle class.

SYMPTOMS.—Genitalia lacerated by finger nails and mucopurulent discharge. Took no interest in play, was always thinking of "making the feeling." Used fingers and other objects and rubbed thighs together. Is now seven years of age. Frequent attacks in twenty-four hours.

TREATMENT.—Broad, diet, hygiene, punishment, physical restraint and tonics. Treatment of no avail.

Case XXVI. Reported by C. W. Townsend. Female, age 6 months.

SYMPTOMS.—Rubbed on chair, red and purple in face, sweating and exhaustion. Several attacks in twenty-four hours.

TREATMENT.—Cured when three years old by mother watching and scolding.

Case XXVII. Reported by C. W. Townsend. Female, age 1 year.

SYMPTOMS.—Thigh friction, sweating and flushing.

Case XXVIII. Reported by C. W. Townsend. Female, age 4 years.

REMARKS.—Family history neurotic. Injury to head when six months old.

SYMPTOMS.—Produced paroxysm by using hands during last three months.

Case XXIX. Reported by C. W. Townsend. Female, age 8 months.

REMARKS.—General health good. Attacks worse when child was tired. Hospital case.

SYMPTOMS.—Genitalia normal. Thigh friction, flushed face, perspiration, quiet, when child was tired.

TREATMENT.—Seen once when three years old.

Case XXX. Reported by C. W. Townsend. Female, age 8 months.

REMARKS. — General health good. Dispensary patient.

SYMPTOMS. — Rotary movements, hands clenched, face flushed, sweating, relaxation. Once a week until four days ago, now every half hour. Genitalia normal.

TREATMENT. — Seen once.

Case XXXI. Reported by C. G. Kerley. Female, age 2½ years.

REMARKS. — Grandmother epileptic. Grandfather a hard drinker. Father very nervous. Patient's general health fair. Dispensary case.

SYMPTOMS. — Vulva and vaginal orifice much inflamed. Urine not examined. High friction and pressure with hands; several times in twenty-four hours.

TREATMENT. — Boric acid wash. Bismuth powder to dust parts. Sodium bromid, grs. 5 *t. i. d.* Much improved; still under treatment.

Case XXXII. Reported by C. G. Kerley. Female, age 8 months.

REMARKS. — Paternal aunt had tuberculosis. Patient well nourished. A dispensary case.

SYMPTOMS. — Vulva enlarged and relaxed, vaginal orifice congested, slight mucous discharge. High friction and moving body up and down. Six to eight attacks in twenty-four hours.

TREATMENT. — Dusting powder of zinc and starch, and the use of a very large napkin, with the idea of mechanically preventing the friction. Cured.

Case XXXIII. Reported by C. G. Kerley. Female, age 7 months.

REMARKS. — Family history negative, well nourished. Patient from dispensary.

SYMPTOMS. — Genitalia normal. High friction and pressing stomach with hands. Three to six attacks in twenty-four hours.

TREATMENT. — Seen but once.

Case XXXIV. Reported by C. G. Kerley. Female, age 2 years.

REMARKS. — Father tuberculous. Nutrition of patient normal. Dispensary patient.

SYMPTOMS. — Adherent clitoris. High friction and hand pressure. Several attacks in twenty-four hours.

TREATMENT. — Large napkin (see above), and punishment. Seen twice. Improved.

Case XXXV. Reported by C. G. Kerley. Female, age 7 months.

REMARKS. — Patient well nourished. Dispensary patient.

SYMPTOMS. — High friction and working body up and down. Genitalia red, swollen, mucous discharge.

TREATMENT. — Seen but once. Napkin and dusting powder.

Case XXXVI. Reported by C. G. Kerley. Female, age 3 years.

REMARKS. — Patient in fairly good health. Social condition good.

SYMPTOMS. — Vulva relaxed. Vaginal orifice red. Urine 1018, acid. High and manual friction. One attack every morning on awakening.

TREATMENT. — Large napkin. Hands held by tape tied about neck. No attack since beginning treatment three months ago.

Case XXXVII. Reported by C. G. Kerley. Female, age 7 months.

REMARKS. — Dispensary patient.

SYMPTOMS. — Adherent clitoris. High friction and pressure with hands. Three or four attacks.

TREATMENT. — Adhesions relieved. Large napkin. Cured in three weeks.

Case XXXVIII. Reported by C. G. Kerley. Female, age 9 months.

REMARKS. — Malnourished. Hospital case.

SYMPTOMS. — Genitalia relaxed and congested at vaginal outlet. Direct contact of heel to vulva. Fifteen to twenty attacks in twenty-four hours.

TREATMENT. — Removed from hospital before treatment could be instituted.

Case XXXIX. Reported by C. G. Kerley. Female, age 9 months.

REMARKS. — Patient well nourished. Social condition good.

SYMPTOMS. — Urine and genitalia negative. High rubbing. Two or three attacks in twenty-four hours.

TREATMENT. — Large napkin. Cured promptly.

Case XL. Reported by J. H. M. Knox. Female, age 2½ years.

REMARKS.—Mother nervous. Father well. Patient feeble-minded, but physically strong. Irregular dilatation of pupils.

SYMPTOMS.—Genitalia normal. Thigh friction began during convalescence from severe typhoid, which began with a convulsion. Ten to twenty in twenty-four hours.

TREATMENT.—Careful watching. Hot bath followed by cold douches. Recovery from thigh friction.

Case XLI. Reported by J. M. Miller. Female, age 6 years.

REMARKS.—Pale, anemic, languid, reticent and retiring. Working class. "Attacks probably induced by acid condition of urine."

SYMPTOMS.—Slight vaginitis and mucopurulent discharge. Urine cloudy—small amount albumin, acid, uric acid abundant; oxalate of calcium, mucus and epithelium. Friction of genitalia on floor—rapid movement, excitement. Six to eight attacks in twenty-four hours.

TREATMENT.—Treated lithemia, corrected acid urine. Improved general health. Corporal punishment, moral restraint. Cured in two months and has remained well.

Case XLII. Reported by J. M. Miller. Female, age 14 months.

REMARKS.—Family history neurotic. Patient irritable and constipated, but well nourished. Middle class. Cause "no other than condition of urine." Social condition good.

SYMPTOMS.—Genitalia red and irritated. Urine acid and loaded with urates and uric acid, few blood cells, and many leukocytes. Thigh friction, flushed face, relaxation and languor. Six to ten in twenty-four hours.

TREATMENT.—Careful feeding. Alkalies. Bromids. Corporal punishment. Thighs tied apart at night. Cold baths. Recovery. Now ten years old.

Case XLIII. Reported by J. P. West. Female, age 9 months.

REMARKS.—Father healthy. Mother had a cough for years. General health fair. Had several convulsions. Attacks more frequent when health poor. Social condition good.

SYMPTOMS.—Clitoris and labia minora swollen and moist. Urine normal. Thigh friction, staring, relaxation, sweating. At times as many as twenty attacks in twenty-four hours. Improperly arranged clothing a cause.

TREATMENT.—Bromid of potash and bromid of camphor. Habit broken with great difficulty and later used hand in masturbating.

Case XLIV. Reported by J. P. West. Male, age 18 months.

REMARKS.—Family history of alcoholism and neurasthenia. General health not good. Constipation. Social condition good.

SYMPTOMS.—Prepuce adherent. Urine normal. Rubbed parts by drawing clothing over them; staring, stiffening, flushing, relaxation, weariness. Several attacks in twenty-four hours.

TREATMENT.—Bromid of potash. Bromid of camphor. Habit easily broken. Recovery.

Case XLV. Reported by J. P. West. Female, age 7 months.

REMARKS.—Family history neurotic. Cousin of case had poor health. Idiot, died at age of three years. Social condition not good.

SYMPTOMS.—Vulva large and rough. Would masturbate only when sitting on hard floor. Rubbed parts on hard surface, became rigid, eyes crossed, fixed and glassy. Relaxation.

TREATMENT.—No treatment except keeping child off floor. Died when three years of age of pneumonia.

Case XLVI. Reported by J. P. West. Female, age 1 year.

REMARKS.—Pale child, fairly nourished. Social condition fairly good.

SYMPTOMS.—Urine normal. Thigh rubbing. Many attacks in twenty-four hours.

TREATMENT.—No treatment. Died when nineteen months old of nephritis.

Case XLVII. Reported by J. P. West. Male, age 2½ years.

REMARKS.—Poorly nourished, cross-eyed, stunted, precocious boy. Social condition fairly good.

SYMPTOMS.—When eight months old masturbation was discovered. Urine normal, penis large. Masturbation worse when ill. Many attacks in twenty-four hours.

TREATMENT.—Scolding, whiplug, tying hands, diaper. Treatment of no avail. Died shortly afterward.

Case XLVIII. Reported by Alfred Hand, Jr. Female, age 3 months.

REMARKS.—Family history good. Patient well. Fontanel open at twenty months. Social condition fair.

SYMPTOMS.—Genitalia moist and inflamed, urine normal. Oxyuris vermicularis. Thigh friction, flushing, pallor and sweating. Many attacks in twenty-four hours.

TREATMENT.—Santonin, quassia, tonics, nerve sedatives. Local treatment of genitalia. Recovery.

Case XLIX. Reported by Alfred Hand, Jr. Female, age 3 years.

REMARKS. — Mother not robust. Father well. Patient's health poor. As health improved attacks ceased. Social condition excellent.

SYMPTOMS. — Vulva red. Persistent albuminuria of cyclic type. Malnutrition and rachitis. Thigh friction and body motion. face flushed, then pale. Diurnal attacks.

TREATMENT. — General hygiene and tonics. Recovery.

Case L. Reported by Alfred Hand, Jr. Female, age 3 years.

REMARKS. — Family history negative. Patient in fair health. Dispensary patient.

SYMPTOMS. — Genitalia irritated. Thigh friction while leaning against furniture, walls, etc. Many attacks in twenty-four hours.

TREATMENT. — Hygiene, diet, antacids, nerve sedatives. Decided improvement when lost sight of.

Case LI. Reported by G. M. Acker. Female, age 18 months.

REMARKS. — Family history negative. Nutrition poor. Social condition poor.

SYMPTOMS. — Genitalia much inflamed and swollen. Pro-lapsus rectum. Eczema of face. Thigh friction constant, when not prevented.

TREATMENT. — Local treatment of calomel ointment, 10 gr. to 1 oz. Diet: Syr. ferri iodidl. Much improved; still under treatment.

Case LII. Reported by B. K. Rachford. Male, age 18 months.

REMARKS. — Family history gouty and neurotic. Social condition the best. Boy now three years of age. Had practiced thigh friction at intervals for one and a half years when he came under my observation. He is well nourished but nervous.

SYMPTOMS. — Very slight adhesion of prepuce, otherwise genitalia normal. Urine very acid, contains excess of urates. Has large adenoid growths. Gastrointestinal canal normal. Thigh friction once or twice a day, especially after long nap. Excitement, face flushed, perspiration, relaxation. Has periods (weeks) of comparative immunity.

TREATMENT. — Prepuce freed and child given 4 grs. benzoate of soda and one minim of tinct. belladonna, *t. i. d.* Attacks ceased at once. One week later adenoids removed. Alkaline treatment continued; general hygiene, diet, quiet surroundings. Now three weeks since treatment began. No attacks during that time.

DISCUSSION.

DR. JACOB. — I have not been surprised that the paper of the President has been so complete and that it moreover contained some new points of view. He has made us acquainted with his views and added to our knowledge of the subject. He falls back upon the embryology and early anatomy of the parts in explanation of this condition. I have been somewhat surprised, however, by his change of title, which was originally "Thigh Rubbing." But I like his new title very much better because it gives at once a clew to the points the writer means to make. He makes the point that masturbation in infancy and childhood is not the masturbation of the adult. He may be right, but it strikes me that he need not necessarily be so in that contention. The fact that children will get well of the disease and without much injury to their future general health, does not speak against the possibility of classifying these cases as true masturbation. Most boys masturbate at some time or other; some young men masturbate for six or eight years and get well, so that there will be nothing in their future life to tell that they have ever masturbated. I think the fact that these infants get over it does not speak against the possibility of classifying their habit with that of the grown-up people. Moreover, masturbation and its effects

will not show themselves with equal strength in all persons, or in the same manner. Even the effect of the loss of semen, like the nervous shock, is not at all the same in every individual; therefore, the degree of excitement, or its results, should not be, in my opinion, a cause for classifying these phenomena as either pseudomasturbation or true masturbation. I am not quite prepared yet to adopt the word "pseudomasturbation." I cannot say that I have ever observed that it showed itself in different ways. It shows the same excitement, the same interrupted respiration, the same redness, flushed cheeks, staring eyes, large immobile pupils, perspiration and exhaustion just as does the sexual act in older people and masturbation in older children. We see the same symptoms of orgasm in the infant. It is a very common thing for such babies to be brought because they have what are called periodic convulsive twitchings. One of the first cases I saw of that kind was a small infant, a year old, that had had these so-called convulsions daily—sometimes only twitchings and sometimes real convulsions, as the father, who was an intelligent physician, told me. I had seen such cases for a good many years. When I told the father, in the presence of the mother, that it was a case of masturbation, the father saw at once the truth of my assertion, but the mother went for me in an indignant manner; it was a regular assault. The father saw that I was correct, however, and later they thanked me and the mother apologized. When I wrote my first article on the subject, now thirty-four years ago, I had seen a good many such cases. Since that time these cases occurring in infants have been reported as being very rare by good observers, particularly in Germany and Denmark, and they express their astonishment that there should be so few. They have reported at length single cases observed by them. To me the condition is not at all rare; I find them all the time. It is not at all uncommon to find that these children have formed the habit before they are six months old. On the first of May a baby was brought to me that had a cough due to paralysis of the uvula and soft palate following diphtheria three months before. The baby, the parents stated, had had convulsive twitchings with attacks of staring, interrupted respiration, and perspiration since she was less than four months old. I know the cases reported as exceptional are not exceptional at all. The method of masturbation varies with these little ones. The hands and fingers are rarely used. Some use thigh friction, others friction of the crossed feet; older ones lean against the shoulders or the limbs of their mothers or nurses or against pieces of furniture. The vast majority are girls at the younger ages, boys during adolescence.

DR. HOLT.—It has been my fortune to see quite a good many of these cases. In looking over my private records I have found notes of 46 cases; and have been struck with the great frequency of masturbation in mentally defective children. It seems with

them to be the rule rather than the exception. In many cases parents who consult me about mentally defective children have never had the subject brought to their attention, but on questioning them I have often found that they have observed these movements in the children without knowing their significance. That leads me to the belief that the general impression as to the effect of masturbation on the mental development of children has been misstated. In many cases the mental defect is the cause rather than the result. I have not seen any instance in which a mental defect was traceable to the habit of masturbation. I think we should be very careful that we do not unnecessarily alarm our patients as to the prognosis, especially as to the effect of the habit on mental development. The prompt and immediate recognition of the cause is of greatest importance. Only recently a friend brought me his little girl of eight or nine years, in whom this habit had been noticed only a few times in the past two or three months. Examination of the urine revealed the condition spoken of by the President in his paper. The correction of the condition brought about immediate cure. Very likely this would have gone on to the formation of a habit that would have been very difficult to break. Parents and nurses should have their attention drawn to this subject that they may recognize it early, and seek medical advice.

Larger experience in the treatment of these patients does not lead me to look with much favor upon mechanical restraint in children over four years old. Recently, I had a little girl who had been kept in one of these frames for a year and it served to call her attention constantly to the habit rather than anything else. On discontinuing this plan of treatment improvement began, and we got the most striking change for the better by stimulating her pride and treating her in a physical way. We had a large calendar placed in the nursery and a series of stars were obtained; every twenty-four hours that she went without indulging in the habit a red star was put over the date; when she had ten red stars in succession she was entitled to a gilt star; an offense was indicated by a black star. This seems a simple thing, but it made a profound impression upon the mind of this child and to a remarkable degree stimulated her will and her effort to control the habit.

I have been very seldom successful in accomplishing anything by stripping back the adhesions of the preputial hood of the clitoris. These adhesions are invariably present in young girls, and when separated soon recur. I have seen but very few cases of masturbation in small boys; nearly all of my patients have been girls. There was not more than one male for every eight or nine females.

As regards the ultimate prognosis, I am not quite so hopeful as Dr. Rachford. I have a number of children under observation now that I have watched for from six to seven years, and while most of them are only occasional transgressors, almost all of them

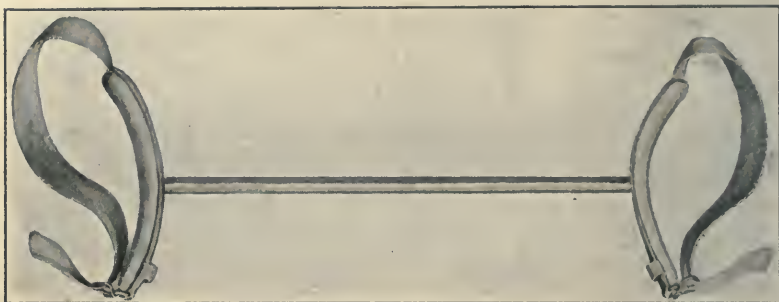
will two or three times a year have outbreaks. These children have been in the main exceptionally bright children, and in robust health. The habit has continued in one little girl up to ten, with no signs of letting up.

DR. KOPLIK.—When the President wrote me concerning cases of “thigh rubbing” in infants and children as a sign of masturbation he worded his letter in such a way that I thought possibly he believed in the habit as an entity, and I wrote that I did not believe that true masturbation could exist in the infant, for I considered that masturbation as seen in older children presupposed an intention, an act, and a resulting explosion; in the infant these do not exist. I was surprised and pleased, therefore, to learn that Dr. Rachford entertained these views. I was surprised at the remarkable concurrence of his mode of practice with my own. I think we should define “thigh rubbing” and “buttocks rubbing” as manifestations simulating masturbation in infants. I have found, as has Dr. Rachford, that the great majority of these cases occur in females. The reason for this has been very well explained by the paper. These children have a neurotic tendency. They are, as Dr. Holt has said, very bright, and often of very bright parentage, but they are neurotic. I recall a case, a girl of eight, who rode horseback. She had a form of convulsive tic and developed masturbation, having a habit of rubbing the parts after a horseback ride. It was possible in this case, by the ordinary forms of treatment, and explanation, to get a cure. I recall another case as bearing out the assertion that these children are neurotic: a little boy, who was very bright mentally, but had habits that were reprehensible. He developed the habit with intention and consummation of the act; this was a true masturbation. These children are neurotic, although mentally bright. If it were not so, we would find the habit in a larger proportion of infants than we do. We see many children with vulvar irritation and preputial adhesions over the clitoris that do not develop the habit. I would advise against proceeding immediately to break up these adhesions or other operative procedures on these parts. I recall 1 case in an infant of so-called “thigh rubbing” in which the phenomena followed each other very closely—probably five minutes apart. It was atrophic, and it was proposed to operate on it at once. This was not done, however, and after a few sésances the child was very much relieved and, I heard subsequently, cured by treatment similar to that mapped out in the President’s address.

DR. KERLEY.—It seems to me that the general trend of this discussion is toward two different subjects—one relating to “thigh rubbing” in infants, and another to masturbation in older children. It strikes me that these are two entirely different conditions.

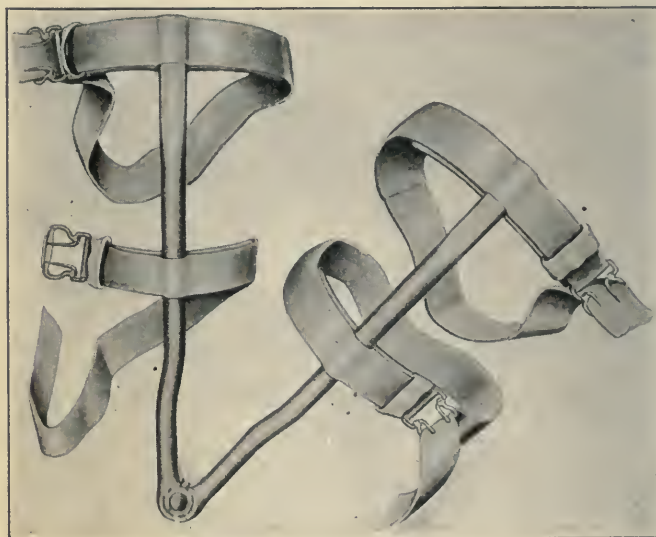
As far as Dr. Rachford’s observations as to the favorable re-

sults of treatment in infants are concerned, I am entirely in accord with him, but when it comes to the treatment of masturbation in older children, after the third year, then the problem is entirely different and the prognosis and results obtained very dif-



ferent. These cases are often very discouraging, and treatment has to be carried out for a long time.

My best success has been obtained in tackling these children in two ways: first, from their weakest standpoint—their memory.



Children forget very readily, and when the practice is prevented they soon forget it. In addition to the hygienic precautions suggested by Dr. Rachford, I have used mechanical restraint, such as the specially devised napkin, with considerable success. This does not work well in children after eighteen months, however.

For these I have gotten up a little device, which I have used with success in a few cases recently, consisting of a thin steel bar, with cross-bars in the form of a crutch. The cross-bars are made of lead and covered with chamois and can be bent to fit the thigh above the knee. This allows a certain amount of motion to the legs, and is not at all cumbersome or heavy, and effectually prevents thigh rubbing.

I would like to show a drawing of another appliance used for children who masturbate with the hands. It is also made of steel, with a hinge which does not permit opening at a greater angle than 45 degrees.

DR. WEST.—In 1895 I reported 3 cases of masturbation in children, looking on masturbation under puberty as being the same as thigh friction. One case has been lost sight of; the other 2 I still know of. The first was that of a female who began thigh rubbing before she was nine months old, and the cause was thought to be improperly arranged clothing. My attention was not called to the child until she was two and one-half years old, by which time the habit had become firmly fixed. It required the mother's unremitting attention for the next eighteen months to break up the practice. The mother finally hit on the expedient of throwing a tincupful of cold water on the child whenever she saw her in, or beginning, the act. She followed this by still further punishment. When six years old—two years after the habit was thought to have been entirely forgotten—she was intubated for membranous croup, and during this sickness she attempted to masturbate with her hand a number of times, but never tried thigh rubbing.

As a child she was always hard to control, her general health and development were not good, and several attacks of convulsions were thought to be due to the habit. She is now a fairly well-developed, but nervous and impressionable, girl of sixteen. She began menstruating at thirteen and has considerable pain at some periods. About a year and a half ago she began to have irregular nervous headaches, nervous spells, and fainting attacks that resemble petit mal. It is my opinion that this habit has had a deleterious effect on this girl's whole life.

The second case was that of a poorly-developed, cross-grained boy two years old who masturbated by rubbing with the hand. A clear history could not be obtained from the parents, but a large penis that became erect on being touched was thought to be sufficient proof. After a tight prepuce with a very narrow orifice was loosened he was easily broken of the habit and a marked change in his condition was soon apparent. When three and one-half years old he was again masturbating, but in a different way. He was not so easily broken this time, but was carefully watched for a long time, and after the entire cessation of the practice he lost his nervousness and became quite robust. An uncle who re-

cently returned from California, where the boy has lived for several years, tells me he has grown into a very large, strong youth. His mother says he occasionally wets the bed, but this is probably seminal emissions.

I have seen only 1 case of masturbation in an imbecile. The idiocy was due to a prenatal meningitis and a history of the case was published in the ARCHIVES OF PEDIATRICS for June, 1896. When twenty-two months old this child was shown to the local Medical Society, and, of the more than twenty members present, only one had ever heard of infants and young children being addicted to this habit. She would only masturbate when set on the floor or other hard surface, and then by to and fro rubbing of the vulva on whatever she was sitting upon.

The 2 following cases are worthy of mention on account of the habit being the indirect cause of the death of both children:—

Annie S., an only child; mother, forty-three, very stoutly built; father, thirty. Child had always required considerable medical attention. Was fairly well-developed and nourished, but nervous and irritable. She masturbated by rubbing the vulva with to and fro movements while sitting cross-legged on the mother's thigh. She was taught this by the very indulgent mother, who never made any serious attempts to break the child of the habit until it was too late. Just how early she began the habit is not known; but she had begun before she could walk. If at any time she wanted to gratify the habit she could compel her mother to take her up and allow her to do so, and if the mother delayed or anyone interfered she would get violently angry and fight like a tiger. From December 17, 1904, when nineteen months old, until her death, February 6, 1905, I saw her from one to three times a day. She first had a mild case of measles, with poorly-developed eruption, and a very slight bronchitis, from which she convalesced very slowly. This was followed closely by another mild bronchitis with slow convalescence. Her slow recovery was attributed to the habit, but it was impossible to get the mother to make a determined effort to stop it. About the time she was free from the bronchitis she contracted a bronchopneumonia. This was not of a severe type, and, after a week with no improvement, it was decided the habit should be ended. The mother was made to nurse the child in such a way that she could not masturbate, or else have her lie in her crib. For five days the child fought vigorously against this, and then gave up, and, with giving up, seemed to lose all interest in life. She would lie in her crib and seldom make a sound or movement, and would allow anything to be done to her now without a protest. An acute nephritis developed, with entire suppression of urine, and three days later she died.

M. E., a cross-eyed, precocious, stunted boy, eight years old, came under my care early in December, 1903, after having been sick with typhoid fever for three weeks. The father is a libertine

—the mother a healthy and good woman. Just when the habit was begun is not known, but the mother attributes the crossed eyes and poor growth to the habit, and says his eyes were straight, and he was growing nicely and was healthy until he was two and one-half years old. The typhoid fever was not severe nor were there any complications, but he did not do well. After his fever should have ended, some fever persisted, he seldom had any appetite, and was much emaciated. His case was a puzzle until the trained nurse who was put over him found the boy to be a confirmed masturbator. It was then that the above history was obtained from the mother. Talking, punishment, tying his hand, and putting on diapers had no effect. His hand was seldom off his penis when he was awake. Anything that prevented masturbation caused continual fretting. It was usually done with the hands, but at times with the thigh. He became more and more emaciated, mildly delirious, very nervous, anemic, edematous, and died after having been sick eight weeks. For two days before his death the penis was very red and much swollen.

As an unusual cause of the habit may be mentioned 2, possibly 3, cases due to circumcision. The rubbing in the beginning with the hand, caused by the itching during healing, and continued as thigh rubbing later on in 2. One of these cases also illustrates the difficulty in diagnosis often met with. This was a boy four years old who had been circumcised for a very long prepuce. After this he was not quite the boy he had formerly been, but nothing particularly wrong could be discovered. His retiring hour had been eight o'clock, but often now, while not apparently sleepy, he would want to be put to bed an hour or so earlier. The morning following this early retiring he was irritable and listless. A watch was put on him, and it was found he was masturbating. The habit was stopped with but little difficulty, and since its cessation he has gotten on nicely.

The second case mentioned is another illustration of the occasional difficulty in diagnosis. This boy had been broken of the habit at two years of age and had begun it again in a different manner when about three years old. The first time he did it by rubbing with the hands; the next by grasping his clothes over the lower abdomen and drawing them up and down along his penis and pressing this organ tightly to his clothes by the thigh. With him there was very little of the stare and relaxation common to the habit, but considerable grunting. The parents, who had previously been made aware of the habit, were sure he was not masturbating now, and I was inclined to believe them until I saw the child in the act.

The following conclusions have been drawn after having watched this habit for several years in a general practice:—

I. There is very much more masturbation in children by the hands, thigh rubbing, and by irregular forms of rubbing than there is supposed to be.

II. In many cases there is no difficulty in making a diagnosis, while in nearly as many the diagnosis is not so easily and certainly made.

III. That a number of children who do not thrive after every care and attention has been given for every disease or trouble that could be found will prove to be masturbators. I have seen many illustrations of this and have been deceived not a few times by parents who were unwilling to acknowledge the practice of this habit in their child.

IV. The effect on the later health of these children has, as a rule, been in direct proportion to the length of time the practice has been going on and the difficulty of stopping it, and I cannot say that the fact that one or both parents were neurotic has had any relation to the practice or to its results.

DR. DICKINSON (visitor).—In 100 per cent. of neurasthenic women you find large labial hypertrophies—friction hypertrophies; and the same, I take it, applies to the neurotic child. All bed-wetters in infancy are masturbators in a certain degree.

Like Dr. Jacobi, I cannot see why there should be two classes made. I take it that the difference has occurred because the men look upon two different classes of cases. There is, as in the adult, the child who does not reach the orgasm and who is therefore said not to have true masturbation, but there is a considerable class that does reach the orgasm, and in it, of course, the habit is true masturbation.

As to diagnosis, coxcomb labia mean repeated friction, so that all marked hypertrophies of the labia should make us suspicious. In the baby this hypertrophy is more common in the prepuce than in the labia minora. When one lip is larger than the other, thigh friction has been the cause.

As to the relation between mental disease and the neurosis of masturbation, I think it is a question of coincidence rather than cause. We know that both children and adults can stand an enormous amount of masturbation without any grave effect upon the general nervous system. This is particularly true of boys who live in the open air.

DR. LADD.—I wish simply to show an apparatus which I have used on a case with success. The principle is very similar to that of Dr. Kerley's—a long section with two cross-bars (exhibition of appliance). The thighs are kept about one and one-half inches apart. It allows the lower legs to be moved freely, while the thighs are held fixed.

DR. RACHFORD.—The term "thigh friction" was discarded because, as Dr. Jacobi mentions, that term does not cover all of the cases. The act is carried on not only by thigh friction, but in various other ways, such as by rubbing with the hands or feet or against some foreign object.

The term "pseudomasturbation" was selected for the reasons given in the paper. The question of the name, however, is perhaps not one of great importance, except that whatever name is selected to describe this syndrome, it should not be a misnomer such as "thigh friction," or "true masturbation."

In typhoid fever and pneumonia the morbid processes affect the same organs and have very much the same pathology both in the infant and in the adult, and the variation in the type of these diseases at different ages does not call for a different name. This, however, is not true of "pseudomasturbation" and "true masturbation"; these conditions are altogether different in their pathology, etiology, treatment and prognosis, as I have explained in my paper, and these differences are due to anatomical and physiological reasons dependent upon the lack of development of the internal genital organs.

"Pseudomasturbation" and "true masturbation" do not affect the same organs, and differ markedly in their effects on the nervous system. Pseudomasturbation is a disease confined almost exclusively to girls. In my table of cases only four were boys. While, as Dr. Jacobi says, most of the cases of true masturbation get well, still the prognosis is nothing like as good as in pseudomasturbation. The question of the name, therefore, may be decided by the view we take of the two conditions.

I agree with Dr. Holt as to the value of restraint in younger children, and that it is of little value in those over four years of age. In 1 case reported in the literature the child died as a result of gangrene started by mechanical appliances.

The neurotic condition, of course, influences the prognosis, and with a return of nervousness from any cause there is apt to be a relapse in an apparently convalescent child. This illustrates the importance of the neurotic condition, hereditary or acquired, in keeping up or causing a return of pseudomasturbation with the aid of other apparently slight reflex causes. A great many children have severe reflex irritations of the bladder, rectum and external genitalia, without developing pseudomasturbation, and when this occurs it is perhaps an evidence that the child has not inherited a neurotic tendency to this disease.

If one keeps in mind the importance of the hereditary neurotic tendency in this condition the case will be kept under observation long after the symptom complex has disappeared by reason of the removal of the reflex or other exciting factors. When the habit has been controlled the child must be carefully looked after for a number of years so as to bring about a normal development of the nervous system, and by this treatment the nervous system is, after a few years, put in such a condition of stability that a slight reflex irritation will not result in developing pseudomasturbation. Then, and then only, may the child be considered well.

THE SYMPTOMS OF STATUS LYMPHATICUS IN INFANTS AND YOUNG CHILDREN.*

BY JOHN HOWLAND, M.D.,
New York.

A very extensive literature exists upon the subject of enlargement of the thymus gland and its connection with sudden death or with death without other lesions sufficient to account for such a result. Almost all of this, however, deals with the pathological findings and with arguments for and against the possibility of death being caused by the mechanical pressure of the thymus gland.

In the beginning of the last century Millard's and Kopp's thymic asthma occupied much of the attention of physicians in every country and it was endlessly discussed until Friedleben by his dictum, "Es giebt kein Asthma thymicum," put a stop to almost all mention of it for several decades. More recently the subject has been renewed with the chief emphasis upon its pathological side. This is not strange, in view of the fact that the majority of these patients die sudden deaths and hence are seen by pathologists rather than by clinicians.

The peculiar advantages afforded at the New York Foundling Hospital have given me the opportunity during the last eight years to observe more than 25 of these cases, many of them clinically as well as postmortem.

It is necessary at the outset to define what is to be considered an abnormal enlargement of the thymus gland. This point has been debated without limit. Observers have varied greatly in their estimate of its normal weight and many have used Friedleben's statistics, almost always misquoting him, for he distinctly says in regard to one of his tables that the averages were made up by weighing the glands of only healthy, well-nourished individuals who had suffered sudden death. Of course, in this way were included the enlarged glands of those cases now under discussion.

The extensive observations of Bovaird and Nicoll obtained by weighing the glands of 495 children under the age of five years have shown that the average weight of the thymus gland at autopsy is, during the first two years, about 6 grams, and that

* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 9, 1907.

this gland does not apparently increase in size during the first two years, but at the end of that time diminishes somewhat. These findings are also almost in accord with similar observations made by Friedleben. We may consider, therefore, any gland weighing more than 10 grams distinctly pathological; but in order to err on the side of conservatism, I have only included in these observations those children with glands weighing at least 15 grams.

The autopsy appearance of this condition is well known. The thymus gland is very greatly enlarged and is at once the striking feature of the case. It extends from a short distance below the thyroid, so low in marked cases as almost to cover the heart. Usually consisting of two lateral lobes, there may be a well-developed third lobe. The weight varies from slightly above normal to 40 grams or more. No *clear* evidences of compression of trachea or bronchi have I ever seen and they have been but seldom reported. A few very small hemorrhages may appear on the surface of the gland; these are also to be seen in sections, and there may be found one or more pockets containing a few drops of gelatinous pseudo-pus, so-called thymic abscesses. All the lymphoid tissue of the body is hyperplastic, the tonsils and adenoids, the superficial as well as the deep lymph nodes. The spleen usually shows a great enlargement from one and one-half to three times its normal size, and in its cross section are seen the very greatly enlarged Malpighian bodies standing out like sago grains. Peyer's patches and the solitary follicles of the intestines also participate in the process. A microscopical examination shows nothing characteristic; the changes are merely a hyperplasia of structures normally present. The enlargement of the thymus gland is the characteristic finding; a great enlargement of this may be found without much involvement of the other lymphoid structures, but a great hyperplasia elsewhere and not in the thymus is practically never seen.

The symptoms exhibited by children suffering from this condition are many, but it seems to me that they enable us to make a division into several different classes. The first one is characterized by sudden death with or without some trifling shock, such as the beginning of anesthesia or the giving of antitoxin. There are practically no symptoms. The child turns over and dies or is found dead in bed; sometimes there is a cry, a slight convulsion or cyanosis. This is by no means rare; in fact, it is very com-

mon. Dudgeon, with a large experience in London, referring to the many children "found dead" who come into the coroner's hands with the diagnosis of "overlying" by their mothers, says that in his experience most of these are good examples of the lymphatic diathesis. Of this class, it is not necessary for me to describe personal cases, though I have performed autopsies on several who have died practically without a struggle, when lying on a bed or in the arms of their mothers or nurses. These babies have all been fat and well nourished. At times the fatal result is delayed somewhat longer and the cyanosis and rapid respiration may be noticed for five minutes or more. Careful inquiry has failed to satisfy me, however, that these children have presented symptoms of tracheal obstruction.

The second class presents the most characteristic symptoms, and from these, at times, we are enabled to make an accurate diagnosis. These children are usually well nourished, but not always so, and frequently rachitic. With or without some slight previous indisposition, the child suddenly becomes very ill. There may be vomiting or slight diarrhea, but the digestive symptoms are always in the background. The respiratory symptoms are prominent; there is usually very rapid, gasping respiration with cyanosis which may be marked; occasionally there is an incessant cough. The dyspnea is out of all proportion to the physical signs; these consist usually of a few scattered râles, increasing in number as the heart grows weaker. The child is generally unconscious; attacks of convulsions are usually seen and often are continuous. The pulse is of fair force at first, but becomes very rapid and feeble toward the close. The temperature is, in the great majority of cases, very high, 104° F. to 107° F., or even higher. It is somewhat affected by efforts to reduce it, but soon rises again. The dyspnea is not an obstructive dyspnea. These symptoms last from a few hours to thirty-six or forty-eight hours, the usual length being about twelve hours. The breathing becomes more rapid, the temperature rises constantly, sometimes to 109° F.; the pulse becomes more feeble and eventually the child dies, the convulsions often persisting to the end. Such a case would pass as a good example of acute congestive bronchopneumonia, and as such, I believe, they are usually considered. The striking points are the dyspnea and cyanosis without sufficient pulmonary involvement to explain them, the convulsions and the very high temperature.

A history will illustrate this better than I can describe it:—

F. U., a well-nourished child, four months old, was returned to the Asylum one afternoon with a slight coryza. His temperature was normal. At four o'clock the following morning he suddenly developed dyspnea with rapid respirations, 80 or more to the minute, his pulse was feeble and very rapid and he was much prostrated. His temperature was 104° F. and rose in a few hours to 106° F. There were a few subcrepitant râles at the bases of his chest behind. He responded fairly well for a short time to stimulation and his temperature was reduced by cold packs but rapidly rose again, the cyanosis deepened, twitching, and finally convulsions came on and he died twenty-three hours after the beginning of symptoms. The autopsy showed a thymus gland weighing 23 grams, an increase in the other lymphoid structures and nothing else abnormal.

More difficult of diagnosis are those cases that run a prolonged course with a gradual onset. The symptoms, when fully developed, are, moreover, not distinctive. There are attacks of dyspnea lasting minutes or hours, alternating with periods of easy breathing. No explanation for the dyspnea can be found and cyanosis of all grades of severity may accompany it. There may be at times entire cessation of breathing for a short period with most intense cyanosis. The lungs are clear and intubation and tracheotomy, that have often been performed, have not had the slightest effect in relieving dyspnea. In the periods of quiet breathing, however, the respiration and pulse may be irregular, and this may lead to the diagnosis of tuberculous meningitis. The temperature is usually low, 100° F.-102° F., sometimes even subnormal. The children are more or less stupid and convulsions may occur at any time, but are more common at the close, death frequently taking place in the midst of one.

An example of this class is the following:—

A well-nourished boy, seven months old, was admitted to the hospital for convulsions. Two nights before admission he had had eight convulsions in the course of as many hours. He was free from these for twenty-four hours and then they began again. After admission he had several short general convulsions, and between them was somewhat rigid. He vomited most of his food. Sodium bromid controlled his convulsions somewhat, but he was very restless and had much twitching. With the exception of the vomiting, which ceased after three or four days, the digestive

symptoms were never marked. His stools were always good. His temperature varied between $98\frac{1}{2}^{\circ}$ F. and $101\frac{1}{2}^{\circ}$ F.; it was usually between 99° F. and 100° F. On January 8th, three days after admission, he had much dyspnea, was cyanosed, and his pulse became weak and irregular. His recovery from this was rapid. Two days later he had another cyanotic attack which lasted eight minutes, and still another lasting five minutes. Thereafter the attacks of cyanosis became more frequent, six or eight in the course of twenty-four hours. He seemed somewhat hyperesthetic, but lay quiet unless disturbed. He coughed somewhat and there were scattered râles in his chest, but at no time was there consolidation. The attacks of cyanosis, with occasional slight convulsions, increased in frequency until January 14th, when he had a very restless night. He cried a great deal, but eventually went to sleep and slept quietly for nine and one-half hours and then suddenly died, nine days after the beginning of symptoms.

At autopsy nothing abnormal was found except anemia of the brain and a very much enlarged thymus gland, with the other evidences of the lymphatic diathesis.

The frequency of enlarged thymus has often been remarked at autopsies on diphtheria patients. Daut, from Escherich's clinic, and others have called attention to this fact. Elser found this to obtain also with epidemic cerebrospinal meningitis. This is also true with other diseases, and in some their course is decidedly modified by the lymphatic state. There can be no doubt that this means that such children are less resistant to infection and succumb easily.

Thus: A well-nourished child, seven and one-half months old, vomited once or twice and had rather frequent green stools. Her temperature was 102° F. when she was brought to the hospital. The fever rose to 104° F. and her condition became correspondingly worse. The following day there was only one movement, not of a bad character and no vomiting, but her temperature rose to 108° F. and the child died. At postmortem there was found a beginning ileocolitis and also a decidedly enlarged thymus.

A much rarer form in children is that associated with purpuric symptoms, hemorrhages into the skin and elsewhere. Acland and Lochte have described such cases in young adults. I saw the following in a child:—

A well-nourished but anemic boy, four years old and slightly

deficient mentally, was considered in perfect health until the morning of August 4th, when after being lifted out of bed he could not stand and fell to the floor. It was then noticed that he could not use his right hand or leg. His throat was red and he had a slight hemorrhage over his right tonsil. On the right cheek there was an ecchymotic spot about the size of a half dollar. There was no history of injury. Scattered over his back were several ecchymotic spots, ranging in size from a quarter to a ten-cent piece. His gums were soft, spongy and bled easily. His pupils were equal and reacted sluggishly. There were marked weakness of the right arm and inability to use his hands well. His right leg was more affected than the arm and both wrist jerk and patellar reflex were exaggerated. The case was considered one of purpura with probably a meningeal hemorrhage. He was treated for such. In the course of the next few days he bled quite freely from his gums, his stools contained blood and his urine albumin and casts. His temperature was low, never higher than $100\frac{1}{3}^{\circ}$ F., but his heart's action was always poor and always rapid, as high as 140 and more. The hemorrhages ceased for a time and then began again and a hemic murmur developed. On August 18th, two weeks after the onset, he had an attack of dyspnea and began to be rather more dull mentally. The dyspnea repeated itself from time to time. He became so comatose as to refuse food and had to be fed by gavage. Finally, on the twenty-first day of his illness, he had a sudden attack of dyspnea, throughout which his heart's action was good; he rallied from this, but another attack shortly after was fatal.

His white blood cells were counted once and were 19,600. No differential count was made.

At autopsy a thymus weighing 22 grams was found with great hypertrophy of the lymphoid tissue of the spleen, the intestines and the lymph nodes. His nervous system was absolutely normal. Microscopically, there was no change suggesting leukemia.

There remains but to mention those infrequent cases in which the thymus acts the part of a tumor obstructing respiration and causing constant dyspnea as opposed to intermittent dyspnea, which is one of the distinguishing features of the other forms. There are several cases of recovery on record after the drawing up of this gland out of the mediastinum or the removal of the whole or of part of the thymus. These patients have no symp-

toms beyond constant dyspnea, existing for a long time, perhaps even from birth, and the usual results of compression of the trachea.

In these different classes of cases two symptoms stand out prominently—dyspnea and convulsions. The dyspnea, however, is seldom of such a type as to suggest obstruction; it is rather such a dyspnea as one sees in pneumonia: the stridor is lacking and there is but a moderate retraction of the soft parts. The difficulty in breathing, moreover, comes and goes, disappearing and reappearing with great rapidity. It seems impossible to believe that any actual obstruction could appear and disappear so rapidly. In the cases dying in the hospital, or out of it, I have made careful inquiry to obtain anything suggesting symptoms of suffocation, but have been unable to elicit any, and in several instances these, had they been present, could not have failed to have been noted, for some of the children died in their mothers' or nurses' arms. In those cases presenting symptoms for a longer period of time the same has been true, though the dyspnea has been at times so extreme that operative measures have been taken to relieve it, but without avail. I saw the case reported by Bovaird that died from the compression of a fatty and fibrous tumor upon the trachea just above the sternum. The dyspnea in this instance was tremendous, totally different from that in any of the thymus cases I have seen and, nevertheless, the tumor was in almost the same position as that of an enlarged thymus. Moreover, in the victims of status lymphaticus the evidences of compression upon other structures, such as the veins, with the cyanosis which one would expect to be intense in the head and neck and upper extremities, are entirely lacking. The cyanosis frequently present is of a mild grade and uniform in its distribution.

It seems to me that the negative evidence furnished by our experience at the Willard Parker Hospital is of value. We have in the course of each year all varieties of obstructive dyspnea to deal with, retropharyngeal abscess, edema of the glottis, etc. The patients are sent in not on account of diphtheria, but for their urgent dyspnea, and yet I have never seen or heard of a case treated there for obstruction caused by a large thymus.

I can add nothing to the postmortem proofs against obstruction as a cause of death so thoroughly expressed by Paltauf, but am led to dwell on the clinical evidence against this position by the article of Warthin which has recently appeared. He says

that "The symptom of chief importance is the respiratory stridor resulting from tracheal compression"; that "in those cases in which the child is found dead the phenomena of thymic asthma most probably preceded death," and that "all the symptoms and all the operative and pathological evidence point to suffocation resulting from tracheal stenosis as the chief, if not the only, cause of death." With the exception of those rare cases cured or capable of cure by drawing up the thymus, I believe these statements erroneous.

The other explanations that have been advanced as to the cause of death are, up to the present time, pure hypotheses. None of them rests upon any anatomical or experimental evidence. Svehla injected aqueous extracts of normal and hypertrophied glands intravenously and claimed to have obtained striking effects on blood pressure and cardiac paralysis. His results have not been confirmed. Dr. A. N. Richards and I tested the toxicity of an enlarged thymus. The gland, which weighed 15 grams, was completely crushed after freezing with liquid air until no cells were left intact. The powder was suspended in salt solution and 6 grams of this injected into each peritoneal cavity of two kittens. There were no symptoms noticed after this.

We endeavored to produce cytotoxins for this gland as Flexner did for lymphatic glands and bone marrow. Our results were negative, as were also Moorhead's in England.

We have undertaken experiments to test the autolytic power of the organs and the toxicity of the blood, but thus far have obtained no positive results.

DISCUSSION.

DR. BLACKADER.—I desire to express my thanks to Dr. Howland for his interesting and valuable paper. It has a special interest to me, as I had some years ago an unfortunate experience with the infant child of a confrère. It was placed under my care when about three months old. Maternal feeding had been discontinued on account of the mother's ill-health, and I experienced much difficulty in arranging a suitable food owing to the low fat percentage possible of digestion by the infant. Nutrition was also impaired by a severe feverish attack of an influenzal nature. It had scarcely recovered from this attack when the mother was ordered to Saranac and took the child with her. A few weeks elapsed, during which the child was regarded as thriving, when I

was hurriedly sent for. I found the child suffering from a marked dyspnea and feeble pulse, but without any physical signs in the chest to account for the dyspnea except an enlargement of the area of thymic dullness. To assist the nurse in charge, who had been with the infant almost from its birth, I sent a second from Montreal, but the child died suddenly soon after the new nurse had taken charge. The mother thought that the strange face precipitated the fatal ending. The autopsy revealed the correctness of my diagnosis. There was no bronchitis or pneumonia, but an enlarged thymus was found, weighing 22 grams. There were, however, no signs of any pressure on the trachea, a fact which raised the doubt whether this enlarged thymus was the true cause of the dyspnea. I am therefore very glad to hear Dr. Howland's opinion upon this class of cases.

DR. ROTCH.—We are much indebted to Dr. Howland for this paper, because it is a subject that needs to be studied, and knowledge of it should be more widespread. I do not think that, as a rule, the practitioner recognizes these cases. We have cases of sudden death, sometimes making a diagnosis of this condition, and at other times being uncertain. A number of times I have not been able to have an autopsy, and the fact that Dr. Howland did have such opportunity makes the report very satisfactory. It will make us all feel very much more comfortable about our cases.

DR. HAMILL.—I was glad to hear Dr. Howland adopt the view that these cases are of toxic origin. It has seemed to me that corroborative evidence is to be found in the similarity between the symptomatology of the infections of the newborn and that of the condition to which he has referred. The seemingly obstructive dyspnea, the cyanosis, the fever, the occurrence of convulsive seizures, and the intermittence of the attacks form a clinical picture common to the two conditions.

I should like to ask Dr. Howland if he has seen any of these cases recover. While we have looked upon infections of the newborn as very fatal, I have, nevertheless, seen cases of streptococcic infection with very severe symptoms recover. I have also seen cases of mild infection running a mild course, ending in recovery. I see no reason why some of these cases of so-called status lymphaticus should not be of mild degree and recover.

DR. HOWLAND.—With the exception of those cases in which the thymus glands acted as foreign bodies, obstructing the respiration and which were cured by operation, I know of no positive recoveries. It is more than likely that children suffering from the condition known as status lymphaticus have recovered, and, indeed, I saw one that I thought did this; but, as there are no positive evidences of this condition other than the postmortem evidences, one can never be absolutely sure.

AFEBRILE PNEUMONIA.*

BY A. L. GOODMAN, M.D.,

New York.

There are few diseases the pathology of which is so well known as that of acute lobar pneumonia. In a typical case the onset is usually sudden, accompanied with high fever, rapid breathing, and an accelerated pulse. In all the text-books much stress is laid upon the temperature and the rapidity of the respirations as characteristic factors. Only lately, in a monthly devoted exclusively to children's diseases, a physician reported a case of pneumonia diagnosed solely on the temperature curve and increased number of respirations. In the typical form of pneumonia, therefore, we have to deal with certain physical signs almost pathognomonic of this disease. There is, however, an atypical form of this malady in which there is no marked rise in the temperature and very little, or no, increase in the number of respirations. Such a case has come under my observation, and I desire to make a brief report of it here.

Fay D., a well-formed girl, eight years of age. Five years ago she had measles. Four years ago her adenoids and tonsils were removed. Two years later she developed a severe scarlet fever, complicated with double otitis media and an acute nephritis. The latter was only transitory in character.

While attending to her regular school duties she was troubled with a short, dry cough of a very persistent character. The mother, an observing and sensible person, took the child's rectal temperature, and, finding it normal, gave her some of the usual cough syrup. The cough distressed the patient both day and night. On the third day from the commencement of the cough I was called to see the little girl. The mother had taken the temperature each day. There was no marked increase (99.2° to 99.6° F.). My thermometer corresponded with that used by the mother. The little patient had a frequent, short, dry cough. The examination of the throat was negative. The respirations were 24 and painless. On percussion, the left side of the chest was

* Read before the Section on Pediatrics, New York Academy of Medicine, January 10, 1907.

normal, but the breathing sounds were somewhat exaggerated. The right side of the chest, almost from the apex to the base of the lungs, was dull; the breathing sounds were distinctly bronchial in character, with very few friction sounds. Vocal fremitus markedly increased. There was no pain, the child's only discomfort being the persistent cough which disturbed her rest day and night. The temperature and respiration were noted every three hours. The respirations varied between 24 and 28. The pulse rate ranged from 88 to 100. The treatment consisted in mild stimulation and rest, plenty of air, and the usual other hygienic and dietetic procedures adopted in acute lobar pneumonia. The physical signs diminished from day to day. On the eighth day the thermometer registered 98.6° F., and after that remained normal. On the twelfth day all the physical signs of consolidation were gone and the cough, which was quite persistent until the eighth day, also disappeared. The urine was negative throughout the attack; the blood examination showed no marked changes; there were no signs of coryza. I have known the family many years. There is no history of syphilis or tuberculosis.

In looking over the literature we find the following references:—

Osler,¹ in his "Practice of Medicine," says: "In old persons and in drunkards the temperature range is lower than in children and in healthy individuals. Indeed, occasionally one meets with an afebrile pneumonia."

In Delafield's "Notes on Lectures,"² one finds this reference: "The height of the temperature is usually in proportion to the severity of the disease; but some cases do well in spite of the high temperatures, some cases get worse with falling temperatures, and some cases die with a temperature below normal. There are rare cases without any rise in temperature."

Strümpell,³ in his text-book, makes no reference to the afebrile type, neither does Leube⁴ refer to this form of pneumonia. Rotch "considers the temperature a very important symptom, almost diagnostic of the disease."

Albert Fraenkel,⁵ in his classic work on the special pathology and therapy of the diseases of the lungs, has the following note: "Occasionally, apparently healthy individuals are attacked with pneumonia *without* any rise, or very little elevation of the temperature. These cases are rare and must not be confounded with

such ephemeræ in which the patient is first seen after the temperature has fallen and the dullness still persists."

In the *Surgeon General's Catalogue* there are numerous pages devoted to reports of atypical forms of acute lobar pneumonia. In reviewing these forms one is at once confronted with a most varied symptomatology, notwithstanding our definite knowledge of the pathology of this condition. If we are to seek an explanation of these unusual types we must not look to the pathological changes in the lung tissue, but rather to the various bacteriologic exciting factors of this disease. If we would examine carefully the chest of every person complaining of a cough, no matter how slight in character, it is possible that these afebrile cases might be found not so rare as one is at first led to believe.

REFERENCES.

1. Osler. *Practice of Medicine*. Fourth edition, p. 117.
 2. Delafield. *Notes of Lectures*, p. 54.
 3. Strümpell. *Specielle Pathologie & Therapie*, 7te Auflage, 1ste Band, s. 311.
 4. Leube. *Diagnose der Inneren Krankheiten*, p. 171.
 5. Fraenkel. *Lungenkrankheiten*, p. 294.
-

Ophthalmia of a Newborn Child, of Pneumococcic Origin, with Grave Lesions of the Cornea.—F. Chaillous (*Revue Française de Méd. et de Chir.*, April 25, 1906) observed this patient, a child seven weeks old. There was an abundant conjunctival discharge and serious corneal lesions. Chaillous, whose first impression was that he was dealing with an ophthalmia of gonococcic nature, made an immediate bacteriological examination of the conjunctival secretion, and discovered in the preparation numerous diplococci. These microorganisms were found mostly among the cells, although some of them were included in the cells. There were numerous polynuclears and some epithelial cells. The colonies were composed of almost pure pneumococci. This observer calls attention to the fact that the diagnosis of ophthalmia cannot be made upon the time of the appearance of the symptoms nor upon the abundance of the discharge. Although pneumococcic ophthalmia, as a rule, is not a grave affection, it may, nevertheless, assume such an aspect.—*Medical Record*.

ENLARGEMENT OF THE EPITROCHLEAR AND OTHER LYMPH NODES IN INFANTS.*

BY ALFRED F. HESS, M.D.,

New York.

About a year ago, in connection with some work on tuberculosis, I was attracted to the question of the enlargement of the various subcutaneous lymph nodes in children. I found an ample literature concerning their involvement in children of the school age, but nothing relating to the frequency of their enlargement in infancy. Although I soon realized that this subject did not offer bright prospects from the standpoint of tuberculosis, I became interested in ascertaining for myself the frequency and extent of the superficial lymphatic involvement. Somewhat later a case of hereditary syphilis with separation of the epiphyses served to direct my attention to the epitrochlear glands. On this point I again gained but little information from the pediatric literature, although works treating of acquired syphilis in adults lay stress upon this symptom. Many books on the diseases of children do not mention these glands, and hardly any give them a place in the diagnosis of hereditary syphilis. This holds true for English, German, French, as well as for American, text-books. As exceptions to this rule may be mentioned Hochsinger and Holt; the latter considers them of diagnostic value after the first year.

The data of which I make use were gathered in the course of examining dispensary patients of two years of age and under, who were treated for various ailments, chiefly for errors in diet. There were 225 in all, and in almost every case the age, the disease, the weight, the enlargement of the anterior cervical, posterior cervical, axillary, epitrochlear, and inguinal glands, whether unilateral or bilateral, as well as the enlargement of the spleen, the nature of the feeding, the history of previous disease or other points of interest were noted and tabulated. I made all the examinations myself, so that the same point of view is maintained throughout.

I was much surprised to find so few babies without any super-

* Read before the Section on Pediatrics, New York Academy of Medicine, January 10, 1907.

ficial glandular enlargement. Of the 225 cases only 6 were of this category; of whom 4 were well nourished and 2 poorly nourished. Four were nursed, 1 bottle fed, and in 1 case the feeding was not noted. Some may believe that these surprising results are due to the fact that the statistics are based upon the examination of sick infants. I am convinced that this was not the case, for many of the babies were well nourished and apparently healthy. Furthermore, an examination of some normal infants under one month old, made to test the accuracy of my conclusions, gave the same results. In a recent article Gundobin states that of 50 newborn infants, 25 showed peripheral glandular enlargement. Considering these facts it seems to me that we should not continue to attribute all these lymphatic enlargements to minute lesions of the skin, for instance, of the scalp, but must regard them as frequently physiological to infancy.

To the inquiry as to which groups of glands are most frequently enlarged, a definite answer can be given. Among the 197 cases in which posterior cervical glands were searched for, they were found 173 times. In the posterior cervical group I included the chain of glands along the posterior border of the sterno mastoid as well as the chain situated along the anterior border of the trapezius muscle. The enlargement I believe to be partly of congenital origin, partly due to lesions of the scalp or pharynx, in a small degree to systemic infection. The group of glands involved next in frequency was the inguinal. They were enlarged in 119 cases out of 147 examined; as often in males as in females. Circumcision seemed to play no part. These figures are not surprising, as we would expect the posterior cervical and inguinal glands to be most frequently affected, for, as Treves pointed out, they drain areas rich in lymphoid tissue.

It would be of little interest were I to state in bare figures the frequency of enlargement of the various groups of glands. Suffice it to say that in infants, as in older children, the submaxillary and anterior cervical, more especially the glands at the angle of the inferior maxilla, are frequently palpable. Enlargement of the axillary glands is also of common occurrence. This was found to bear no direct relationship to the cervical involvement, judging from the cases of cervical adenitis observed.

Of all the superficial glands, enlargement of the epitrochlear is the most exceptional. These glands are by no means difficult

to palpate in infants, provided the correct method is employed. All who have considered this question have laid stress upon the importance of the technique of this examination, and experience has convinced me of its importance. The method which yields the best results consists in supporting the patient's forearm with one hand while palpating the gland with the index finger of the other. The thumb of the examining hand should rest just above the external condyle of the humerus. In this way, after some practice, the smallest gland will be felt. The only difficulties I experienced were at times in distinguishing between the gland and the ulnar nerve, or in failing at first to note a gland situated unusually high, or, as in one instance, of mistaking a supra-condyloid bony spine for an enlarged gland. The mere mention of these possible sources of error will no doubt help others to guard against them. Besides the 225 cases of which I have spoken, I examined 75 cases solely for the presence of epitrochlear glands. If glands were felt their size was noted, the degree of enlargement being expressed by four grades—minute, small, large, and very large.

Of the 300 cases examined, numerous infants were found to have one enlarged epitrochlear gland, but unless this was large no importance was attached to it. Minute bilaterally enlarged glands were found to be very common. Small bilaterally enlarged glands were found in 26 cases. As these represented a great variety of diseases, and included only three cases of syphilis, little weight can be attached to such glands. Large bilaterally enlarged glands were found, however, in only 15 cases of the 300. Six of these were, or had been, afflicted with syphilis, and two of these were only seven weeks old. One of them had epitrochlear glands the size of large marbles, the largest I have ever felt. Of the remaining 9 cases 3 were probably syphilitic; 1 had a large liver and spleen, and the mother gave a history of two miscarriages; the mother of the second had had three miscarriages and eight children died in infancy; the third child had snuffles since birth. Of the six remaining cases with large epitrochlear glands, two had tuberculosis with general glandular involvement, and one had furunculosis of long duration. I am unable to state the cause of the enlargement in the other 3 cases. Possibly syphilis may have played a rôle in these also. However, the fact that bilateral enlargement occurs so rarely in infants, and proved of

syphilitic origin in a majority of the cases, is certainly a striking and, I think, an important fact. This cannot be applied to older children. Among them bilaterally enlarged epitrochlear glands, whether due to local lesions or previous infectious diseases, are far more frequent and therefore of less importance. In their case the glands must be more pronounced in order to be given weight in the diagnosis of syphilis. However, in two brothers, six and seven years old, this was the first sign that led me to entertain the idea of possible syphilitic taint.

Since I have paid particular attention to the epitrochlear glands I have had an opportunity, especially at the Out-Patient Department of the Babies' Hospital, Dr. Kerley's service, and also at the Bellevue Dispensary, Dr. Fielder's service, of examining 15 cases of hereditary syphilis in infants. Seven of these had large bilaterally enlarged epitrochlear glands; in 4 they were small; in 3 they were not palpable. This is too small a number of cases from which to deduce conclusions as to the frequency of the involvement of these glands. But in order to give these figures value they must be correlated with the above statistics, which show how rarely these glands are enlarged from other causes. Considering these two facts, it would seem to me that the presence of large epitrochlear glands must be carefully weighed as a factor in diagnosis. Besides the 2 cases mentioned above, where palpation of these glands led to the correct diagnosis, there were 3 cases in infants where this symptom indicated the true nature of the disease. One case seems especially striking: It concerned a little baby who was brought to the Bellevue Dispensary for some slight intestinal derangement. The child had been regularly treated in another section of the Dispensary. As the mother held the infant I palpated the epitrochlear glands, which I made it a rule to do, and to my surprise found them enlarged. The baby showed no signs of syphilis and was moderately well nourished. Inquiry proving futile, I referred to the history sheet of the child and found that it was being treated for hereditary syphilis. This case illustrates a point which I wish particularly to emphasize. *All symptoms of syphilis may disappear under mercurial treatment, but the epitrochlear glands may persist as the sole objective symptom of the disease;* so that in some cases only a routine examination for these glands will reveal, or even suggest, a previous infection. A more striking illustration of this fact is afforded by

the little girl whom I am able to show you this evening: Her mother had one miscarriage at four months and three seven-months' babies who died in early infancy. This child, when about five weeks old, showed classical signs of syphilis; maculopapular rash, enlarged spleen, rectal condylomata. After a few months the spleen, which had extended the width of a finger below the free border of the ribs, could no longer be palpated, and all other signs had seemingly disappeared under treatment with bichlorid of mercury and mercurial inunctions. The child has been treated for more than two years and is certainly the picture of health. Nevertheless, large, hard, bilaterally enlarged epitrochlear glands persist, the left the size of a marble. Glands of such magnitude and consistency are pathognomonic and are products of syphilis only. The spleen, as I have stated, is no longer palpable. One large, hard posterior cervical gland can be felt and is probably specific in origin.

With these and similar cases as object lessons it hardly seems reasonable that we should neglect the examination of the epitrochlear glands, a simple procedure not even requiring the undressing of the child. I believe this should constitute part of the routine examination in the case of children of wet nurses, and of such infants as are given to foster mothers to be nursed. In this way we might occasionally avert those rare but sad instances of syphilitic infection of the innocent, the result of a healthy mother nursing a syphilitic child or of a healthy child being nursed by a syphilitic woman.

The spleen and the epitrochlear glands should always be viewed as a unit in the consideration of hereditary syphilis. The presence of an enlarged spleen, associated with large bilaterally enlarged epitrochlear glands in an infant, is good evidence of syphilis. I have seen two exceptions to this rule: a case of tuberculosis, and one of Von Jaksch anemia. The value of mere enlargement of the spleen, unassociated with other signs, is lessened by the fact that it occurs in many other abnormal conditions. Among 155 infants not afflicted with syphilis it was palpable in 11 instances; rickets and tuberculosis constituting the main causes. To sum up, therefore, my estimation of the value of epitrochlear glandular enlargement, I would say that its absence by no means casts doubt on the diagnosis of hereditary syphilis but that its presence is an important diagnostic sign which

may serve for a long time as the sole landmark of a previous infection.

What is the cause of the enlargement of the epitrochlear glands in hereditary syphilis? In the first place, they may be only part of the general glandular involvement, which is sometimes, but by no means regularly, present in this disease. This would account for some cases, but not for those where the glands seem, as it were, especially singled out by this infection. In these instances, I believe the enlargement is due also to local causes. The spirochetæ of Schaudinn, the recognized causative agent of syphilis, have been found, in the hereditary form of the disease, to be localized in especially large numbers within the lymphatic glands, at the epiphyseal junctions, and in the neighboring periosteum. The only superficial glands which lie in close proximity to epiphyseal boundaries are the epitrochlear glands. It would seem logical, therefore, to expect that of all glands these should be particularly affected by a disease involving the adjacent bone and periosteum. Whether an epiphysitis or a periostitis, however slight, must be present in order to involve the glands, only numerous pathological examinations can determine.

As I referred to general glandular enlargement, I would like, in closing, to say a word as to my experience in this regard. Among my cases the tuberculous babies showed such enlargement most often, and I believe with others that this symptom should be considered in arriving at the difficult diagnosis of tuberculosis in infancy. The majority of the cases were of the healed tuberculosis type and showed merely scars of previous cervical adenitis. This is an argument in favor of regarding the swelling of the lymphatic nodes as a means of defense against a general tuberculous infection. Secondly, children showing malnutrition showed glandular enlargement above the average. However, the exceptions are numerous. Many poorly-nourished infants, in whom the lymph nodes are exceptionally easy to palpate, presented no general lymphatic enlargement. Lastly, rachitic children must be placed in this group.

My material was too limited to permit me to draw conclusions as to the effect of measles and other infectious diseases. Enteritis, however, I found did not bring about general glandular involvement; in fact, in one case I observed that the enlargement decreased following an acute attack of diarrhea. (Discussion on page 626.)

ANENCEPHALUS.*

BY C. H. LEFCOWITCH, M.D.,

Associate in Pediatrics, Jefferson Medical College, Philadelphia.

James P. W. was a full-term infant and lived for thirty-three hours. The labor was abnormal in so far as the soft vertex with

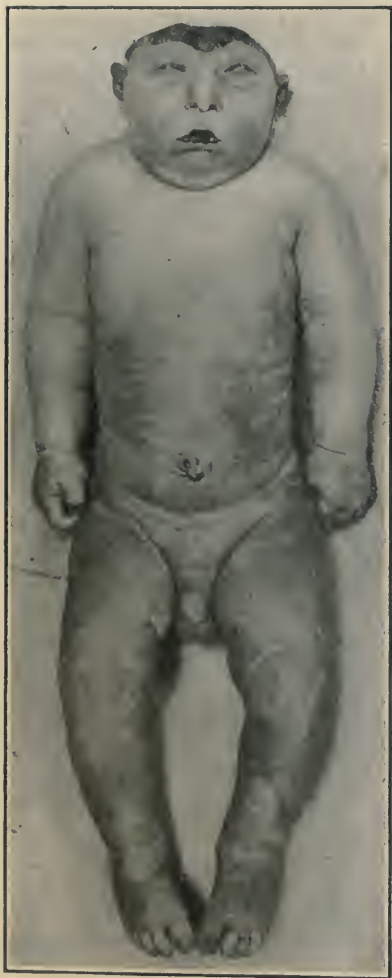


FIG. I. CASE OF ANENCEPHALUS.

the rigid sides presenting were thought to be the breech and also that the head on account of the small size was easily delivered and the shoulders, but with some difficulty on account of their relatively large size. He was markedly cyanosed during life, although no definite murmurs could be distinguished. Excepting the deformity of the head, the body was well developed. He was able to nurse, sucking vigorously, and his grasping power was forcibly demonstrated. His parents enjoyed good health, giving no history of tuberculosis, syphilis, gout, rheumatism nor of any nervous diseases. They confessed to the use of alcohol in moderation (?). The mother during pregnancy received no fright or injury, although her most intimate female acquaintance volunteered the information that the mother was kicked in the abdomen and it was strongly inferred that this

mark of affection was bestowed by the male being who had solemnly promised to protect her. There are three other children

* Read before the Philadelphia Pediatric Society, January 8, 1907.

living and well. The parents do not know of any other deformities in their families, near or remote.

The bones of the skull on a line drawn above the orbits are absent, the cavity being covered by the scalp bearing a fair growth of hair. The upper eyelids both present a small fissure in the center of their margins and the face bears a peculiar expression, as of "youthful dissipation," which was noticed in all the illustrations referred to.

No extra effort was made by the attending physician to prolong life. Numerous cases of anencephalus have been observed in premature births. Of those born at term some were still-births and some lived as long as eight days.

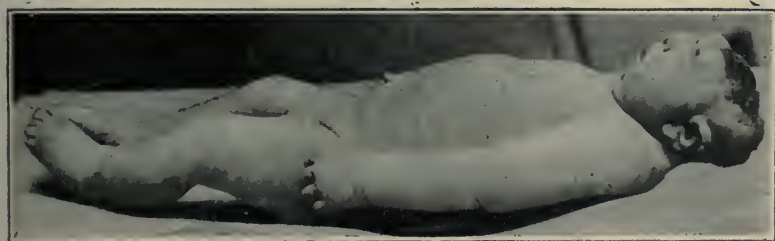


FIG. 2. CASE OF ANENCEPHALUS.

Report of Autopsy, by Dr. Henry E. Radasch, Associate in Histology and Embryology in the Jefferson Medical College:—

The body was well nourished and well developed. No external marks beside the absence of the cranial portion of the skull were present. The subcutaneous fat was well developed and nearly 1.5 cm. thick. The muscles were somewhat pale. Upon opening the abdominal cavity some bloody serum was noted; small in quantity and without noticeable origin. The peritoneum showed patches apparently petechial, varying from the size of a pinhead to $\frac{1}{4}$ of a cm. in diameter. The abdominal organs showed nothing abnormal.

Upon opening the thoracic cavity the large size of the thymus body was first noted. This measured 3 cm. long, 2 cm. wide and about .75 cm. in its thickest part. Weight, 30.5 grams. Its consistence seemed normal and section showed nothing abnormal.

Portions of the thymus were fixed in a 4 per cent. solution of formalin, infiltrated, sectioned and stained according to approved laboratory methods. Microscopic examination showed nothing

abnormal. The lobules were well differentiated into cortex and medulla. The cells respond well to the various stains and appear normal in structure. In the medulla the corpuscles of Hassal are both numerous and characteristic. They are somewhat larger than the usual size, but show nothing abnormal. With elastica stain the vessels are normal, the elastica being well de-

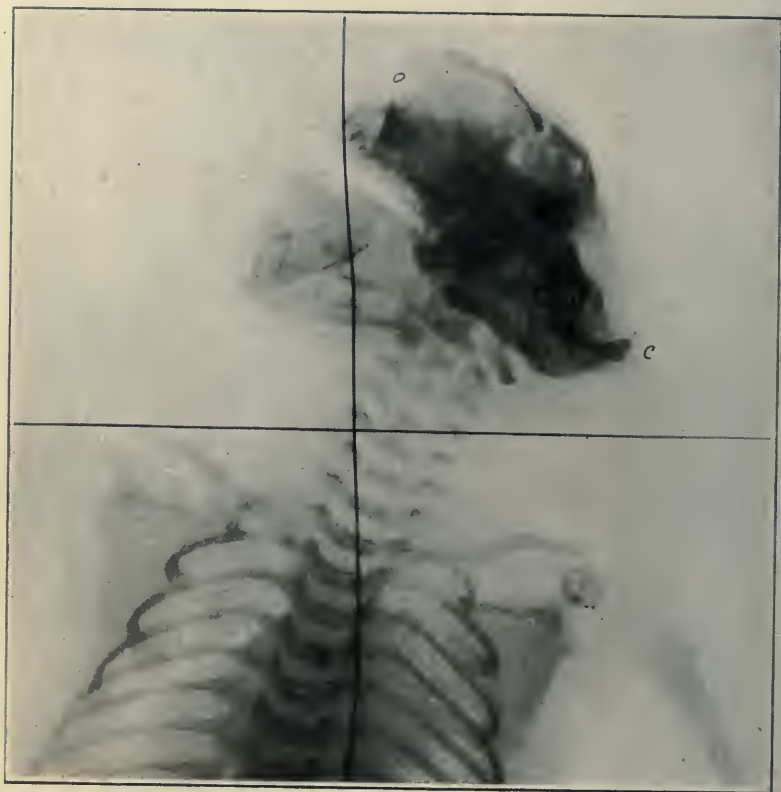


FIG. 3. X-RAY PRINT OF CASE OF ANENCEPHALUS.

veloped and abundant. Sections stained by Mallory's reticulum method show the reticulum very well. This seems less dense than in the usual organs, but this is probably due to a rapid increase in the cellular elements without a corresponding increase in this supportive tissue.

The heart was normal in size and shape and weighed 30 grams. Upon opening this organ the foramen ovale was found

to be still patulous, but not abnormally large. The lungs were normal in appearance and consistency and showed nothing unusual upon section.

The head was covered by normal scalp except in the region of the vertex, where, for an area of about 2.5 cm. in diameter, it was of a reddish color and devoid of hair. Upon section the scalp was found to be quite thick except over the above area. In this region there was a small clot adherent to the under surface of the scalp. Beneath the scalp the floor of the cranial cavity lay exposed. The vertical plate of the frontal, the squamous portion of the temporal and the vertical portion of the occipital bones were absent. The floor was unusually heavy and solid; in the sella turcica region, peculiarly saddle-shaped. There was no trace of the cerebrum, cerebellum or pons and the orbital cavities in no way communicated with the general cranial cavity. No indication of dura was noticed except in the region of the foramen magnum. Here was found a fibrous membrane of about $\frac{1}{2}$ cm. in diameter. In the foramen was some nervous tissue that seemed to indicate the lower part of the medulla oblongata.

All of the vault of the cranium was absent, *i.e.*, that portion which is of intramembranous origin; that portion derived from cartilage, the floor, being present in its entirety.

From the above data, the condition represents, apparently, atrophy of the primitive brain vesicles above the metencephalon, after the formation of the optic vesicles. That the atrophy, or arrest of development, did not occur sooner is apparent from the fact that the eyeballs are present and seem normal in structure.

Angell and Elsner¹ in March, 1895, recorded a case of pseudencephaly which lived for eight days with bilateral divergent strabismus and continuous spastic rigidity of the limbs.

Serres,¹ 1812, at Hôtel Dieu, of Paris, saw an anencephalic child which lived on milk and sugar water for three days.

Saint Hilaire¹ reports a case of anencephaly which lived but fifteen minutes.

Clericus,¹ in 1871, saw a child without a cerebrum which lived for five days.

LeDuc¹ cites a case without cerebrum, cerebellum and medulla oblongata which lived for thirty minutes.

Lawrence¹ records a child that lived for five days with deficient brain and cranium.

Geoffrey Saint Hilaire² classifies this type of monstrosity into:—

(a) Anencephalus, in which are cases that show no traces of any brain substance; and

(b) Pseudencephalus, in which are included cases that show some evidences of a rudimentary brain.

Examples of true anencephalus are more frequently found in cases of abortion, and the earlier the abortion the more apt we are to find involvement of the spinal cord and vertebræ.

Forster³ claims that the deformity is due to intrauterine inflammation or "hydrops of the cephalorachidian cavity." According to Ahlfeld,² the accumulation of the serum within the ventricles is so great during the fourth week of fetal life as to cause rupture of the brain and its membranes with complete atrophy of these structures. And Ahlfeld also states that the large amount of fluid prevents the complete closure of the cranial cavity by the bones of the skull. Amniotic adhesions to the scalp have also been assigned as frequent causes of this deformity.

I wish to express my indebtedness to Dr. William R. Bready, the attending physician, for the opportunity of presenting this curiosity to the Society.

REFERENCES.

1. Gould and Pyle. *Anomalies and Curiosities in Medicine*, 1897.
 2. Hirst and Piersol. *Human Monstrosities*, Vol. II.
 3. *Trans. Obst. Soc., Kings Co., Brooklyn*, 1879-1880, Vol. IV., p. 376.
-

A Note on Vaginal Drainage in Children and Young Adults.—Lea affirms (*Medical Chronicle*, May, 1906) that vaginal drainage may be used with great advantage in children and young adults, differing with Kelly and others who advise against this channel in such cases, and recommend the rectal route in preference. The author has used vaginal or abdominovaginal drainage in thirteen girls between five and fourteen years. In seven it was for appendicitis, in six for tuberculous peritonitis, all but two of the cases recovering. He thinks it should be used in all cases of acute diffuse peritonitis in children, and in pelvic abscess. The advantages of the vaginal route are its simplicity, the avoidance of danger of infection, and the facility which it gives to irrigation.—*New York Medical Journal*.

ARCHIVES OF PEDIATRICS.

AUGUST, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

ROYAL STORRS HAYNES, PH.B., M.D.,

ASSOCIATE EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

President and Treasurer, E. B. Treat; Secretary, E. C. Treat.

Contributors and Correspondents, see page III.

ON THE CARE AND MANAGEMENT OF THE WET NURSE.

In this country good wet nurses are not easily procured, and unskillful management may cause failure even when a good nurse has been found. In selecting the nurse it is naturally of the utmost importance to be sure that the mother and her baby are free from any tuberculous or syphilitic taint. A strong young woman of placid temper should be sought, and there should be made a careful and complete physical examination, first of the breast glands and nipples, to be sure that there is a good and obtainable supply of milk, and then of the lungs, pharynx, lymph nodes and skin, including vaginal inspection if there is any suspicion of syphilis.

Formerly great stress was laid upon the "age of the milk," meaning, rather, the age of the infant. This point is, however, of no great moment, since the composition of breast milk changes very little after the first month; and it is found by experience that infants of a month or two thrive satisfactorily when taking good breast milk several months older. Altogether, it is best to take a woman whose baby is at least six weeks old, or even older, for the reason that any signs of congenital syphilis will be apt to have appeared by that time, as they may not in infants younger. For this same reason, in no case should a nurse be taken whose infant is under three weeks of age. Before or while examining the infant one should make sure, generally best by the way the nurse treats the baby, that it is really her own offspring, and not a baby borrowed for the examination.

Aside from the strictly medical aspects of the selection, there are other considerations. To avoid some of the complications of the situation—and particularly the sudden determination of the wet nurse to abandon her charge—one should, if possible, engage a woman who has no entangling family ties, a woman as completely detached, so to speak, as possible. The husband or other children are apt to prove very disturbing factors, so that, for strictly nutritional purposes, a woman who has lost her husband and has no other children is to be preferred. The objection frequently raised against wet nurses that their milk may transmit undesirable moral qualities has, of course, no weight.

Again, the proper disposition of the infant, both for its own sake and for that of the foster child, is of great importance. No matter how lowly, or even degraded, her station, the wet nurse is almost invariably fond of her baby and is anxious that it should thrive. The parents of the foster infant should be made to feel that they are responsible for the care and health of the wet nurse's baby. Not only on the ground of common humanity should this responsibility be felt, but also for the sake of their own infant; for if the infant of the wet nurse is not thriving her milk is apt to become scanty or injurious because of her worry.

Often the wet nurse's baby can be cared for by relatives, or some good private home may be found; or, finally, though not as a rule desirable nor safe, the baby may be placed in an asylum or hospital. The main object is to be sure that the baby gets adequate care, judicious feeding and early medical attention if needed. It must be emphasized here that many of the so-called "good places" for wet nurses' babies are veritable baby farms, requiring for adequate description the pen of a Dickens or a Zola. The infants that thrive in these places do so in spite of ignorant attendants, overcrowding and lack of fresh air. Too often the life of the wet nurse's baby is actually and speedily sacrificed for that of the foster suckling.

In certain circumstances her baby should accompany the wet nurse if success is to be attained. If the foster infant is premature, congenitally feeble, or sickly and unable to nurse well, the wet nurse's baby is necessary in order to keep up the milk supply. Nothing makes a breast dry up more quickly than to have it inadequately nursed. Even pumping the breast, if it has to be continued for some time, produces the same result, notwithstanding massage and all the other means of promoting the breast secretion. It is a common experience to have a nurse with abundant milk lose her supply after a week or two of nursing by a feeble baby. In such cases, then, the wet nurse's baby should be wholly or partly nursed, and the milk can be pumped for the foster child if necessary.

Another circumstance in which the wet nurse's baby should accompany the mother is when no satisfactory home can be found for it. Then the baby can be fed artificially under the direction of the family physician.

As to the wet nurse herself, the aim is to keep her in good physical and mental condition, and the chief difficulties in her management are not medical, but domestic. It is most important to give her enough to do in the way of work and exercise, and to avoid pampering her with too much or too rich food. A regular daily régime should be laid out prescribing a certain

amount of housework (such as light washing, ironing, cleaning windows, making beds, etc.) and of outdoor exercise (such as a brisk walk, or wheeling the perambulator).

As to diet, the food given should be as nearly as possible in grade and amount like what the woman has been accustomed to in her station in life—merely avoiding articles that are clearly indigestible, or that will adversely affect the milk, and insisting upon a large amount of fluids in the form of milk, gruels, broths and purées. The diet should consist mainly of milk, purées, a moderate amount of meat and eggs, cereals, green vegetables, stewed fruits, simple puddings, stale bread, and gruel between meals and at night. Special diet for modifying the milk is rarely needed if the nurse is not overfed and has sufficient exercise. Beer may be necessary to keep the woman reasonably happy. Corn-meal gruel and malted foods or malt extracts increase the amount of milk. The great trouble with wet nurses is that they are apt to be overfed on unaccustomed or rich food, and to become fat and lazy, then domineering. Plenty of walking, housework and plain, well-cooked food exercise a wholesome moral influence, as well as have a good physical effect. Although there are many devoted and honorable wet nurses, there are also others who have little sense of honor, and whose cupidity prompts them to make the most they can in money out of a situation of which they are allowed to feel the mistress. The wet nurse frequently “runs the house,” just as the baby has made everything secondary to itself. Firmness and tact, pity for the woman’s ignorance and the determination not to be bullied, are needed to deal with many of the exasperating situations that arise.

One who has much experience with wet nurses often wishes that he might have less; and yet there are many cases of delicate infants for whom breast milk is a necessity, notwithstanding the great strides that have been made in successfully feeding infants artificially. A little more thought and kindly consideration for the wet nurse and her baby would at times bring about success in most unpromising conditions.

SECOND INTERNATIONAL CONGRESS OF THE
"GOUTTES DE LAIT"—FOR THE PRO-
TECTION OF CHILD LIFE.

As most of our readers know, there was held in Paris, in 1905, the First Congress of these admirable medico-philanthropic agencies. The "Gouttes de Lait" and the "Consultations des Nourrissons" have as their objects: (1) To give advice to mothers; (2) to encourage breast feeding; (3) to distribute proper milk to those infants that cannot have sufficient breast milk.

Remarkably good results have been obtained in reducing infant mortality, not only in Paris and other French cities, but in many continental cities that have followed the French example. Various adaptations of the principle have been made, so that milk dispensaries or municipal milk depots for furnishing either clean, pasteurized or modified milk for infants are to be found in almost every large city. Much has been done also in the way of keeping in touch with nursing mothers and advising them with regard to the hygiene and care of their babies.

The Second International Congress of the "Gouttes de Lait" will be held in Brussels September 12 to 16, 1907, and it promises to be a most interesting and instructive meeting.

It is proposed to widen the scope of subsequent congresses, so as to include in their programmes all questions relating to the welfare of infants. This proposition will be the first question discussed at the Congress. There will probably be formed, also, as a result of this discussion, an International Union of Institutions for the Protection of Child Life, this union to be a permanent institution which can bring into closer relation all the various agencies for the protection of child life, and which can also direct the discussions and promote the work of the periodic International Congresses.

The preliminary programme of the Brussels Congress indicates that there will be two sections—the first concerned with

social and philanthropic questions, the second with the problems of infant hygiene.

The topics to be discussed under the first section are as follows:—

1. Are the “Gouttes de Lait” and other institutions for the protection of infant life satisfactory means for the prevention of tuberculosis, and can they be considered as forming the first necessary step in the solution of the problem of the prevention of tuberculosis?

2. An account of the legislation of different countries concerning the control of the production and distribution of milk. Special stress will be laid in the papers on the measures taken in certain towns for the control of infants’ milk.

3. (a) Description of institutions of different countries for the prevention of infantile mortality. (b) Exact statistics of infantile mortality in each country.

Under the second section will be considered:—

1. (a) The regulation of infant feeding: (1) Breast feeding; (2) artificial feeding. (b) Study of digestion in infancy (glandular appendages of the alimentary canal, intestinal flora, feces, etc.).

2. (a) The different milks used in artificial feeding, and the indications for their use. (b) Practical and rapid clinical methods of analyzing milks.

3. Instruction in the hygiene of infancy by official and private agencies, and its popularization in different countries.

The members of the Congress include many of the leading pediatricists of Europe, together with numerous philanthropists—among whom is our own Nathan Straus—and the municipal and medical officers from cities in every part of the world. Dr. Goler, whose system of municipal milk depots has been so successful in Rochester, is the other of the two delegates from the United States.

The proceedings of the Congress should prove of the greatest interest and value to all physicians who work among children.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, January 10, 1907.

DR. GODFREY R. PISEK, CHAIRMAN.

A CASE OF DIABETES INSIPIDUS.

DR. ELI LONG presented the case. He said that, although not very common, this disease existed in children, he believed, more frequently than was supposed. It might be of moderate degree, and remain unnoticed unless enuresis or some intercurrent illness called attention to the daily amount of fluids drunk and urine excreted. It has been recognized since the seventeenth century and many experiments have been made upon the lower animals to locate that part of the brain from which originated secretory impulses to the kidneys. In rabbits and dogs this had been found to be a portion of the floor of the fourth ventricle, different parts of the middle lobe of the cerebellum and the posterior portion of the pons. From analogy one can see how injury or inflammation, such as a basilar meningitis, could cause polyuria in man. It had been observed also that more moderate lesions and stimuli of the nervous system might act the same way; for example, abdominal injuries and tumors acting probably through the solar plexus. Gerhard has said that in idiopathic diabetes insipidus the disease was due to a disturbance of the secretory function of the kidney and not to an increase in the thirst or to blood changes. Osler has stated that it resulted from a vasomotor disturbance of the renal vessels, due either to local irritation, as in the case of an abdominal tumor, to cerebral disturbance in cases of brain lesion, or to functional irritation of the cells in the medulla, giving rise to continuous renal congestion. Whether the hypersecretion of urine depends upon chronic congestion or overacting special secretory nerves, or both, there are many things which act as exciting causes. Tumors, inflammation of the cranial bones, meninges, brain and spinal cord, disease of the sympathetic nervous system, psychical derangements, alcoholism, epilepsy, hysteria,

inherited psychopathic tendencies, etc., injuries to the general health, excessive bodily and mental activity, heat or cold, and bad hygiene; also infectious diseases, and, finally, in the so-called idiopathic cases, no discoverable cause. In general, we should place syphilitic inflammation of the brain first in order of importance, with possibly trauma next.

The diagnosis depends upon the quantity and quality of the urine excreted and the transitory or permanent character of the disease.

The symptoms are polyuria and great thirst; so great that patients restricted as to fluids have drunk their own urine; poor appetite usually, constipation, ocular changes, headache, lumbar pains, loss of weight and general deterioration of health, rarely edema of the feet, etc.

The prognosis was said to be good in idiopathic cases, the patients for years drinking and excreting great quantities of water.

The treatment was unsatisfactory. Restriction of fluids only distressed the patient. The boy presented, not being allowed water during an attack of scarlet fever, bit a hole in his ice cap and sucked it dry. Sedatives, opium, bromids, valerian, ergot, adrenal extract and electricity have been given. Mercury and iodids also have been given in suspected specific cases.

The cases Dr. Long presented were a boy and a girl, aged eleven and ten years. The boy, a son of a tuberculous parent, began the disease with, or following, measles eight years ago. He drank large amounts of water during the day and a couple of quarts at night. He could not eat breakfast without first drinking two or three glasses of water. If not given a glass of water he would climb up and put his mouth under the faucet. As he lived on the top floor, rather than take the time for numerous trips up to his home when playing on the street, he had made friends with the corner druggist, whom he astounded with the amount of water he took. His measured twenty-four hours' urine averaged 14 pints, or 7 quarts, often being 8 and 9 quarts. His weight was 34 pounds. The amount of urine excreted amounted to more than one-third his body weight in twenty-four hours. Analysis of the urine gave a specific gravity of 1.001 to 1.002, and no sugar. His general condition was poor, his teeth were bad, he had enlarged cervical glands, the axillary, inguinal

and epitrochlear not being palpable. There was edema of the optic nerve on its inner margin on the right side. There was also a marked choroiditis of the left eye, probably due to syphilis. The mother had had one miscarriage following his birth, and the father died of tuberculosis.

The girl he brought to show polyuria resulting from trauma. Three weeks ago she fell backwards while skating and struck the back of her head. Since then she had lost much flesh, had wet the bed, a thing she had not done in five or six years. Her thirst had increased and she passed large amounts of urine daily. He did not know exactly how much, not having had time to determine this. The mother stated that she almost filled an ordinary chamber during the night. Judging the day-time excretion to be something less than her daily amount, it would be approximately 4 or 5 quarts. This case he only saw yesterday and he had not had an opportunity to examine the urine carefully. The specific gravity he found to be 1.035, and there was so much glucose that the chemist reported as follows: The specimen contained so much glucose that he could not but feel that some error had been made in the specimen and another specimen was desired. If no error had been made this seemed to be another case of diabetes, but, unlike the boy, one of diabetes mellitus. Dr. Long hoped to be able to show the case again when a complete urinalysis had been made of the urine of the girl, as well as of the boy.

DR. HERMAN SCHWARZ said that during the last two years he had had such a case under observation, a boy of twelve years. It was first noticed that the child passed a great deal of urine and drank large quantities of water. The father of the child died at the age of forty of cerebral hemorrhage. The mother was perfectly well.

The child had an easy birth, and was fed exclusively on the breast up to fifteen months of age. At this time the mother noticed the child would crave for water. He would often drink 2 or 3 ounces of water and then take the breast. When the child was three years old the mother could not get shelter for the boy because he drank so much and wet all the floors. She therefore brought him to the hospital, where he was declared perfectly healthy and his excessive drinking thought to be a bad habit. At present he is in the fifth grade and is rather a bright boy. He had scarlet fever in a light form when five

years old, and measles when seven years old. His general health has been good; he has occasional headaches, but no dizziness. His sight has been good and he is good at sports. His appetite is fair, bowels good, and he has no cough or vomiting. The boy was first seen in August, 1905, when he weighed 66 pounds; in March, 1906, he weighed 69 pounds. When first seen he passed 10,400 c.c. in twenty-four hours. He passed 39 ounces at a time, 344 ounces in twenty-four hours. On March 3d he passed 11,800 c.c.; on a salt-free diet he passed 8,000 c.c. The urine had a specific gravity of 1.0025; there was no albumin, no sugar, and the urea was 310 grains in twenty-four hours. He took over twenty-six glasses of water in the twenty-four hours. The blood examination showed hemoglobin, 85 per cent.; red cells, 4,800,000; white cells, 8,000.

The question would arise in this case whether it was one of polyuria or of polydipsia. It has been shown in cases of true diabetes insipidus, as differentiated from primary polydipsia, chronic nephritis, etc., that the molecular concentration of the urine as demonstrated by cryoscopic examination remains the same no matter what diet the patient may be put on. If salt should be added to, or entirely withdrawn from, the diet, the only change would be in the quantity; the total solids and the freezing point would be the same.

DR. HENRY KOPLIK called attention to 2 cases of supposed diabetes insipidus, both of which ended up with cerebral growths.

DR. SARA WELT-KAKELS said she had seen 2 such cases.

The first case was a little girl, nine years of age, who had a fall to which it seemed as if diabetes insipidus was due. The amount of urine passed was from $4\frac{1}{2}$ to 5 quarts in twenty-four hours. Under treatment this amount greatly diminished.

The other case was a boy of six years, who weighed 36 pounds, and who passed urine in large amounts. This quantity diminished while under observation. The smallest quantity passed in twenty-four hours was 8,600 c.c.

Both these children took so much fluid that there was little opportunity for taking nutritious food. Metabolism was more active in these children.

DR. H. W. BERG said that a great many of these cases of diabetes insipidus were not cerebral in origin or due to disease of

the renal parenchyma. He recalled the case of a boy of five or six who came to his office for many months, and who was looked upon as a typical case of the disease. One night Dr. Berg was sent for and he found the boy was suffering from severe colic in the suprapubic region, the pains being so intense as to require the use of morphine. The next day, because of the fact that the boy passed an excessive amount of urine, and had so much pain, Dr. Berg passed a sound and came across a stone in the bladder. When this was removed the diabetes insipidus was cured.

Dr. Berg said that diabetes insipidus, in a large proportion of the cases, was due to some peripheral irritation, and the cause was, therefore, not always central. The general practitioner should not look upon diabetes insipidus as an entity at all, but should look for the cause.

CASES OF VISCERAL SYPHILIS IN CHILDREN.

DR. SARA WELT-KAKELS presented these cases.

The first was a boy who had been presented to the Section on Pediatrics February 9, 1905, when he was nine and a half years old. He was the youngest of five children. The four older children were all healthy. The father was said to have contracted lues two years prior to the birth of the patient. The child was born not quite at full term, was very small, and had to be wrapped in cotton for the first two weeks of his life. He also lost much blood through the slipping of a ligature around the cord. Soon he began to suffer from snuffles. When six months old there appeared swelling of the bones around the right elbow joint, which was supposed to be due to rickets. There were also an umbilical and two inguinal hernias. When he was one year old he had a luxation of the right shoulder joint. When two years old he had measles, with complicating pneumonia and croup. In his fourth year he suffered from paronychia on the right great toe, which required a few months to cure. When six years old he began to suffer from an interstitial keratitis in both eyes, for which he was treated more than a year. He was brought to Dr. Welt-Kakels for treatment for enlarged lymphatic glands of the neck four years ago. During the summer of 1904 he suffered from bronchitis, and never had eruptions on the skin. Later he complained of abdominal pain, had no appetite, was constipated, and tired easily. The boy was found to be badly nourished; two years ago he weighed 36 pounds, was rather undersized for his age, his skin

was pale and sallow, there was no icterus, the upper median incisors were notched, and there was slight enlargement of the cervical, inguinal, and epitrochlear glands. There was a slight systolic murmur, most likely anemic in origin. The abdomen was considerably enlarged, the abdominal veins, particularly on the right, much dilated, with slight dullness in the lateral portions of the lower half of the abdomen, and a wave of fluctuation could be obtained. The liver was very large, mainly the left lobe, and was not sensitive on pressure, rather hard and resistant to touch, the upper border being in the right mammary line at the fifth rib, the lower margin of the right lobe ending about two inches below the free border of the ribs, while the lower edge of the left lobe was distinctly palpable some distance below the umbilicus. The extent of liver dullness over the left lobe was five and a half inches. The spleen was much enlarged, and its dullness joined the hepatic dullness; it extended about three inches below the free border of the ribs, was not sensitive, and gave a feeling of resistance; its surface was smooth. The urine was normal. The erythrocyte count was 4,480,000; leukocytes, 11,000; and hemoglobin only 30 per cent. Nothing abnormal was found in the differential count, when the patient was presented two years ago. At present, the hemoglobin (Dare) is 64 per cent.; red cells, 4,460,000; white cells, 13,200. The differential count showed polynuclears, 61 per cent.; small lymphocytes, 28 per cent.; large lymphocytes, 10 per cent., and eosinophiles, 1 per cent. The color index is 0.71.

Since the child was presented, two years ago, he has made considerable progress under an interrupted treatment. He was treated with inunctions of iodids, but the progress was so slow under this that it was changed, and he was placed on intramuscular injections, with very satisfactory results. During the last three months a gumma has appeared on the leg. There has been a marked general improvement.

The second case was a boy, three years of age and over, who had been brought to the Mt. Sinai dispensary on the 8th of October, 1906, with the following history: Both parents were well; there was no history of lues. They had been married four years and the mother had had no abortion or still-births. Besides the boy presented there was a little girl six months old, born at full term, without syphilitic stigmata. The patient was born

at full term after a very easy delivery. He was not asphyxiated and appeared to be well developed. He was breast fed for two years. He never had snuffles or any eruption on the skin. The first tooth appeared when he was six months old, and he began to walk at one year. When seven months old he had varicella.

His present illness dated back to about five months ago, when he used to play, romp, etc., and he then lost his appetite, had some fever, cough, profuse perspiration, and some disturbances of his digestion. He had profuse diarrhea, with foul-smelling discharges. He lost much flesh and was under the care of various physicians and was treated mainly for pulmonary disease, and later for swelling of the liver. Examination of the patient first revealed a very sick-looking child, poorly fed, somewhat cachectic, moaning and crying when touched, especially when the abdomen was palpated. The skin and visible mucosæ were pale. Of the superficial lymphatics, the cervical, axillary, epitrochlear and inguinal glands were slightly hypertrophied. The rectal temperature varied from 101° to 103° F. The head was rather large, with some protuberance of the tubera frontales and parietalia. There was a stomatitis and superficial ulceration of the mucosa of the tongue, cheeks, etc. There was a slight bronchitis; otherwise the lungs were normal; the heart was normal. The abdomen was moderately distended, mainly on the right side. The umbilicus was slightly protruding and the superficial veins were markedly distended. There was no ascites. The liver occupied a large part of the abdominal space, and its surface was hard and uneven; the border appeared to be rounded and thickened. Inflation of the colon did not show changed position or size of tumor. The upper limit of liver dullness was in the nipple line on the fifth rib. The lower border of the liver projected in the right nipple line one finger's breadth below the umbilicus, while laterally it nearly went to the crest of the ilium. The left lobe of the liver did not participate in the great increase in size. The spleen was moderately changed; its surface was even and hard, and the lower border was rounded and projected about two fingers below the free border of the ribs. There was considerable diarrhea, with stools of bad odor. Microscopically, it was found to contain fibers of meat and some undigested vegetable matter. Examination of the feces proved to be negative. The urine contained no albumin, casts or sugar, but there was some bile pig-

ment. The blood examination showed red blood cells, 3,580,000; white blood cells, 26,600; hemoglobin, 46 per cent.; color index, 0.69. The differential count showed: polynuclears, 51.5 per cent.; small mononuclears, 37.5 per cent.; large mononuclears, 2 per cent.; eosinophiles, 3 per cent., and no mast cells.

This child was treated by intramuscular injections and the improvement was so marked that it was difficult to believe that a child could improve in such a short time as it did. The spleen diminished greatly in size, and the mother looked upon the child as a healthy one.

DR. GODFREY R. PISEK asked what the treatment was.

DR. WELT-KAKELS replied that it consisted in injections of bichlorid of mercury, starting carefully with small doses, which the child stood well. There were no unpleasant or bad effects and, therefore, the dose was increased. Dr. Welt-Kakels said she had not used the insoluble salts of mercury because she got better results from the soluble salts. The child received three injections a week.

A CASE OF AFEBRILE PNEUMONIA.

DR. A. L. GOODMAN read this paper. (See page 599.)

THE ENLARGEMENT OF THE EPITROCHLEAR AND OTHER LYMPH NODES IN CHILDREN.

DR. A. F. HESS read this paper. (See page 602.)

CONGENITAL SYPHILIS.

DR. W. B. JENNINGS read this paper. During the year 1905 there were reported to the Health Department 169 abortions, 3,903 cases of death from "congenital debility," premature births, preternatural births, malformations and marasmus under three months of age, and 6,352 still-births. Considering these cases he thought it was reasonable to suppose that in a large per cent. death was due to specific disease. Dr. Jennings had a series of 65 cases of specific disease, 51 cases under one year of age, all seen from time to time during the past three years. There were 33 males and 52 females. A positive family history of syphilis was obtained in 25 cases, the greater number giving a paternal infection. From a table given it was shown that the greatest number of cases in this series were only one month old or under,

the second and third months of age being the next most frequent. This corresponded to the observations of Miller, of Moscow, and Holt, of this country. As a rule, if pemphigus was not present at birth, it would appear within forty-eight hours if it appeared at all. Pemphigus appeared in 5 per cent. of his cases, and all had bullæ on body and head as well as on hands and feet. Snuffles was one of the most common symptoms and persisted for a long time. The skin eruptions might be described as *syphilitic dermatitis*, not unlike erythema intertrigo except that there was a marked desquamation. It was most commonly seen around the genitals and buttocks and inner sides of the thighs; it often extended over the abdomen, as well as the extremities. Macules, papules, superficial ulcers, condylomata were the forms of eruption most frequently met with. Ulcers and fissures of the lower lip and mucous patches in the mouth were also present. The hair was affected in a few cases. One case had an apparent paralysis of the soft palate together with a laryngitis. In only 1 case was any joint affected. One or two cases of dactylitis were seen. Fully 40 per cent. of the cases were well nourished. In children over six months old there was often a delayed dentition. Marasmus was present in about 6 per cent. of the cases. Rachitis was present in 2 or 3 cases and in 1 case, a child of nine years, a diagnosis of gumma of the liver was made. The glands enlarged were, in order of frequency, inguinal, cervical, axillary and epitrochlear. Porrot's nodes were not observed in a single case. The prognosis was unfavorable if the child was without treatment; they all responded rapidly to treatment by mercurial inunctions. Gray powder given internally was of value; if it caused diarrhea Dover's powder was added. Black wash was used for the snuffles.

DR. HENRY KOPLIK spoke of the frequency of enlargement of lymph nodes occurring all over the body in children, and also the necessity of caution in placing much value on such enlargements, unless they were of considerable size and accompanied by clinical symptoms. He said that one of the most common phenomena in infants and children was the enlargement of the axillary, the cervical, and other nodes to the size of a split pea; and this occurred so frequently in infants and young children that they were of little value *per se*. There was some significance attached to such enlargements, however, in leukemia, when of considerable size and developing under observation, or in cases with pulmonary involvement. If

one met with an extensive eruption apparently syphilitic, enlargement of the lymph nodes was quite significant. In children with adenoids one also met with enlargement of these nodes all over the body (lymphatism). Again, where a child had not been bathed probably for months, the lymph nodes would be enlarged from the irritation of the lymph chain by dirt. Minute scratches with subsequent infection would cause such enlargements. In the absence of other signs of syphilis Dr. Koplik certainly would not make a diagnosis of syphilis basing it merely on enlargement of the epitrochlears. In estimating the enlargement of lymph nodes in children it was important to state as definitely as possible their size, whether the size of the head of a black pin, of a split pea, etc.

DR. H. W. BERG said that he was unwilling to make a positive diagnosis of syphilis in an adult or in a child without enlargement of epitrochlear glands in connection with other symptoms of syphilis. There are cases of congenital syphilis in young children in which the diagnosis meant the life or death of the baby, and yet one was not sure that he was dealing with congenital syphilis notwithstanding the fact that several of the speakers had stated that the diagnosis of congenital syphilis was very easy. Reliance could not be placed on the reaction to mercury and the iodids, although this illogical test is often used to confirm a suspicion of congenital syphilis. Enlargement of the epitrochlears means a suspicion of syphilis. In scarlet fever, the only omnipresent symptom is enlargement of all the lymph glands of the body, particularly those of the groin.

DR. A. ROSE continued the discussion. Six years ago Hochsinger described an affection which he named hereditary syphilitic phalangitis. This phalangitis is more frequently found on the phalanges of the fingers than on the phalanges of the toes. It is a typical and characteristic early manifestation of hereditary syphilis and begins at the proximal phalanges, which also throughout the course are more intensely affected than the distal ones. Hochsinger by means of Röntgen rays has found that osteitis begins at the borders of bone and cartilage not only in the phalanges, but also in metatarsal or metacarpal bones when they are simultaneously affected in phalangitis hereditosyphilitica.

Characteristics are: The predominance of the affection of the proximal phalanges, the absence of suppuration or perforation outward, inclination to spontaneous restitution and the subacute

course of the disease, the absence of pain during its development. The proximal end of the proximal phalanx where the osteitis begins becomes enlarged, giving the finger a bottle-shaped appearance, the fingers seeming broader and longer. The soft parts, as remarked before, do not participate, only the skin, being stretched, becomes thinner, is shining and rose colored. The affection is multiple, but not symmetric. Characteristic is finally that the joints remain intact.

The hereditary syphilitic affections of the fingers after the first year of life, as a rule, do not show the same characteristic type; here caries may set in, also arthritis. Later syphilitic phalangitis, with the characteristics of that in infancy, is exceptional.

Hereditary syphilitic phalangitis in infants is one of the most amenable forms of hereditary syphilis to therapy. Local treatment is not required; general antisymphilitic means will accomplish complete and permanent cure within six to ten weeks.

DR. SCHWARZ said that what Dr. Jennings had stated regarding pemphigus was equally true of pemphigus neonatorum. Sometimes it occurred only on the hands and palms; at other times it appeared on other parts of the body. There was a difference between the two that should be mentioned: in pemphigus neonatorum the fluid from the blisters showed eosinophile cells, which were not present in the other form.

DR. SIDNEY V. HAAS said that he had examined the lymph nodes in babies at the Vanderbilt Clinic and his experience showed that enlargements existed in nearly all the cases. Many had enlargement of the epitrochlears without other symptoms. After investigating the importance of these enlargements for many months he gave up in despair, finding these enlargements to be a regular thing.

DR. HENRY E. HALE, JR., said that, in considering this infection, two questions should be taken up. First, the nature of the infection, whether it was a mixed one, *i.e.*, from both parents, or whether it was a single one. Also, they should learn how recently the infection had been acquired by the parent. Furthermore they should learn whether syphilis occurred in embryo, or whether the child was infected during the embryonic or post-partum period. The treatment depended somewhat upon the time of the infection. All knew that when the parent was infected recently the lesions were, as a rule, severe. Those cases presented

visceral syphilis and did not get well under the ordinary treatment. They required the intramuscular injections of mercury.

DR. HENRY HEIMAN recalled some cases that he had had under observation in which the ordinary treatment failed to effect a cure; but as soon as the intramuscular injections of mercury were given the symptoms rapidly cleared up. The death-rate of the newborn depended upon how early during intra-uterine life infection took place. In the majority of the cases where the infants died under six months of age, there was, as a rule, a recent infection of the parent.

DR. H. W. BERG said that in measles 30 per cent. of the cases had enlargement of the lymphatic glands at the groin. In scarlet fever all the lymphatic glands of the body were enlarged, as a rule, and the inguinal glands in 100 per cent. of the cases.

DR. CHARLES N. DOWD said that the cases which he saw were almost all cases of late congenital syphilis, since children under two years of age are not admitted to St. Mary's Hospital for Children.

In the older children the bone lesions predominate, particularly those of the tibia. Joint lesions and corneal opacities were occasionally seen. Marked syphilitic enlargement of the lymph nodes, however, is rare; he said that for years he had been on the lookout for cases of enlargement of the cervical lymph nodes due to syphilis; he meant enlargements of these nodes to a size which suggested their removal by operation. Several surgeons had reported the removal of enlarged cervical lymph nodes which were supposed to be tuberculous, but which were subsequently found to be syphilitic. In an experience of more than 200 cases, however, he had found only 1 case in which there was a fair suggestion of really large syphilitic nodes in the neck, and this patient had the typical appearance of a syphilitic child, but the neck was greatly swollen and the masses of enlarged nodes were very prominent. It was manifestly important that the child should be relieved of these nodes, whether they were syphilitic or not, and accordingly the greater part of them were removed. They were soft, grayish in color, and of a uniform granular appearance. Microscopical section did not stain well, and showed no definite structure.

Mercury was then given to the patient, and the remaining induration subsided.

DR. HENRY W. FRAUENTHAL thought that these glands might have been syphilitic and that it was the tuberculous infection which caused their breakdown.

DR. DOWD thought that Dr. Frauenthal might be correct in his belief. He had seen tuberculous nodes which presented the same gross appearance. He was not at all sure that the case was not one of tuberculous lymph nodes in a syphilitic child. He said he could not prove that they were. The microscope indicated syphilis rather than tuberculosis.

DR. LAPOWSKI called attention to the fact that at present we have a very valuable criterion in arriving at a diagnosis of hereditary syphilis: the presence or absence of spirochetæ in the efflorescences. In 90 per cent. of lesions they are present. Our conception of syphilis in the light of the latest investigations is greatly changed. As to treatment, he never relies on injections in infants. In his experience, inunctions properly applied gave satisfactory results in nearly all cases.

DR. HESS, in closing the discussion, said that he must insist upon some of the points offered but probably not sufficiently emphasized in his paper. Enlargement of the epitrochlears to be of value should be bilateral. Again, to be of any value they should not be too small. They should be enlarged to not less than the size of a pea. In 300 cases he found such enlarged glands only in fifteen instances; in most cases syphilis was present. By the aid of enlargement of these glands a diagnosis of syphilis was possible. Very few text-books mentioned epitrochlear enlargement in congenital syphilis. He was surprised that, in the 65 cases reported by Dr. Jennings, no mention was made of pseudoparalysis.

Raynaud's Disease in Children.—Sommelet (*Thèse de Paris*, 1905), who has collected statistics, is of opinion that Raynaud's disease occurs as frequently in children as in adults. He met with 6 cases in one year. The writer raises the question whether Raynaud's disease differs in the child and the adult. He is of opinion that ulceration and tissue destruction are slight in the former, impairment of function is less marked, and there are practically no general symptoms. In children the disease follows vasomotor disturbances. Local syncope and asphyxia constitute general evidence, and there is usually considerable pain.
—*British Medical Journal*.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, January 8, 1907.

ALFRED HAND, JR., M.D., PRESIDENT.

DR. S. S. WOODY showed a patient of nine years with diabetes.

DR. JOHN K. WALKER read the notes of a case of

DIABETES IN A CHILD.

DR. MILLER said that he is at present interested in a case in which he has been able to keep the urine free from sugar by regulating the amount of bread. The patient had lost 25 pounds, but has never had more than 1 per cent. of sugar in the urine. Dr. Miller can give the patient oatmeal, and yet have the urine show no increase in sugar, although the ingestion of bread immediately increases the amount. The explanation has been advanced that oatmeal is not absorbed; that is, the carbohydrate element, only the albuminous portions of the oatmeal being utilized. The oatmeal is supposed to create an irritation of the intestine, which prevents the absorption of the other elements.

DR. EDSALL said that while it is true that oatmeal often does not increase the amount of sugar in the urine in diabetes, he personally is inclined to believe that it is not lack of absorption that accounts for this fact; for potatoes and milk may be used at times without increase of the sugar, and the same is at times true of levulose, or fruit sugar. Dr. Edsall thinks it not improbable that we shall learn some day that the different effects of different carbohydrates in some cases of diabetes are due to the production from these various carbohydrates of different kinds of dextrose. This is, of course, only a suggestion; but we already know various kinds of dextrose, and it is not improbable that we shall learn that the kinds produced from the carbohydrates that appear suitable in certain cases are different from the kinds produced from unsuitable carbohydrates; and that the organism makes use of the suitable kinds, while it cannot use the unsuitable ones.

DR. C. H. LEFCOWITCH and DR. H. E. RADASCH (by invitation) showed a specimen of anencephalus, with histological report. (See page 608.)

MR. CHARLES J. BRANCH (by invitation) showed an improved apparatus for the preservation and heating of milk in the nursery.

DR. MILLER said that he had a suggestion to make, as the result of experience with his own babies. He thinks that the cooler in the nursery should be large enough to contain the supply of milk for the whole day. The ordinary nursery refrigerator is useless, and the household refrigerator is not the proper place to keep the bottles. As there is always danger of fire from heating milk at night under ordinary conditions, he regarded the heater as a useful addition to the nursery armamentarium.

DR. JAMES H. MCKEE reported a case of

CONGENITAL JAUNDICE.

CONGENITAL OBLITERATION OF THE BILE DUCTS.

DR. J. P. CROZER GRIFFITH reported a case of congenital cirrhosis of the liver in which obliteration of the cystic duct, and possibly of the common duct as well, was found at the autopsy. The case occurred in a male infant of five months, and was marked by persistent jaundice and gradual failure of health.

APHASIA IN TYPHOID FEVER.

DR. ALEXANDER H. DAVISSON reported as a clinical note a case of aphasia in typhoid fever, occurring in a ten-year-old girl, who had a moderately severe, but uncomplicated, attack. For seven days the child was in a condition of stupor, and during the eight days following this, though she could be aroused and was cognizant of her surroundings, she could not talk and evinced her chagrin at this inability by a whining cry. Toward the end of this period she nodded her head "yes" and "no." Speech returned abruptly. The aphasia was not during the period of stupor, but following it. There were no mental complications.

ANNUAL ADDRESS OF THE PRESIDENT.

BY ALFRED HAND, JR., M.D.

MEMBERS AND GUESTS OF THE PHILADELPHIA PEDIATRIC SOCIETY:

In obeying the constitutional mandate I must ask your patience for a few moments while I review the work of the Society during the past year and follow the precedent set me by a number of my predecessors in attaching to this review some free advice.

We have fallen upon times of the multiplication of medical meetings to such an extent that there are now nearly as many meetings to attend in a week as there were in a month ten or fifteen years ago if my memory serves me rightly. It is possible that the number is excessive at present, but the law of the survival of the fittest, though slow-working, is inexorable and will apply in this as in other realms. It therefore behooves the Pediatric Society to indulge for a brief time once a year in retrospection and see if it can give a good account of the past.

Attendance on Meetings and Membership.—The average attendance during the year has been forty-seven, a number to which the Society may pardonably point with pride as indicating the degree of interest aroused by the programmes. A closer analysis of the minutes of the meetings shows that only a little over one-half, or twenty-nine, are members of the Society. We welcome the visitors most heartily and hope that many will seek to be enrolled as active members. Early in the year there were but few visitors, the average attendance at the first four meetings being twenty-nine, but at the meeting in May, when the special topic was "Milk," there were sixty-eight non-members, and the fall meetings likewise drew a large number of outsiders. It is probable that many of these visitors are eligible to membership, and it therefore seems to me that it would be advisable to enlarge the powers and duties of the Membership Committee, so that the ice of bashfulness on the part of anyone who, like Barkis, "is willin'," may be broken and a constant, organized effort be made to increase the membership. At the same time each member of the Society should feel that he is an unofficial member of the Membership Committee and should lose no opportunity to bring in a new member. Experience shows, however, that this method, upon which the Society has thus far relied, is just about enough to balance the yearly loss in registration. We have at present 203 members, so that for the last five years there has been little fluctuation in the number, but with a little earnest work this could be kept at 250 or above without any trouble. This is an important matter, for, as Osler says, if we wish to keep young we must walk with the young; and, therefore, if the Pediatric Society is wise it will seek to draw in many of the younger members of the profession with their hyperpyretic enthusiasm.

Proceedings.—During the year a wide range of subjects has

been brought before the Society, so that a faithful attendant on its meetings could not fail to be benefited. Thirty patients, presenting various interesting conditions, have been exhibited. Three card specimens have been shown, and twenty-nine papers have been read, all of them interesting and valuable. To mention any of them specifically would be invidious, but all forms of literature appropriate to a medical meeting were well represented, including papers based on scientific research, monographs on phases of different diseases and clinical reports. One meeting was devoted to a consideration of some acute abdominal conditions in childhood with a discussion of the surgical and medical aspects. We have had no foreign pediatricist of note to address us during the year, as has been the custom, the Executive Committee having devoted that meeting to a discussion of "Milk."

Judging by the attendance, the Society seems to do its best work when the programme is as varied as possible, for then the catering is to a greater diversity of tastes and more are attracted to the meetings. Thus at the November meeting the hall was practically filled, and although adjournment did not take place until five minutes before eleven o'clock, a goodly number remained to the end.

Publication of Transactions.—Two years ago the Society changed one of its policies, under which it had flourished: that of disclaiming ownership in the papers read before it, and entered into an agreement with the publishers of the ARCHIVES OF PEDIATRICS to have the Transactions appear only in that journal. The expense of this method was a factor in leading to a return to the original policy of having an "open shop," many physicians being reluctant to see their papers in print, but being willing to present what they have, often of great value, and to allow the Recorder to make abstracts for publication. Interested as we are in pediatrics, it is, of course, natural to wish pediatric literature to flourish, which we think will occur better under the old plan, to which we have returned, although it may throw more work on our faithful Recorder.

Milk Commission.—This, in brief, is the record of the year, a retrospection to which may be added a little introspection while we inquire: "What are we here for?" and "What of the future?" The aim of the Society at its foundation is set forth in the Constitution, and although you may have frequently perused it I will

refresh your memory by quoting: "Its object shall be the promotion of the study of disease in children in all its branches, etc." How well we have met that during the year has already been told. The Society embarked on one of the "branches" several years ago when it appointed its Milk Commission, little dreaming of the possibilities of such an act or of the almost world-wide influence which that act has exerted. I may add that the Society as a body is in deep ignorance of what the Commission has already accomplished. Not long ago, in talking with a layman connected with the milk industry, I said that while the aim of the Commission was to get a supply of milk suitable for infant-feeding, it was also its hope that ultimately it would lead to an improvement in the general milk supply. The instant reply came, "It has already done so." It is our earnest recommendation, therefore, that the Society keep in closer touch with the Commission by having a report at each meeting of the routine work of the Commission, giving the bacterial counts and such other data as would tend to awaken a lively interest on the part of the Society, and also an appreciation of the thankless task imposed upon the Commission's Secretary.

Executive Session.—As a final recommendation I would urge, with reference to the executive session of the Society, that it either be transferred to the first part of the evening, or else that the routine matters be referred to the Executive Committee. This had to be done at several meetings when the exodus at the end of the scientific programme failed to leave a quorum. The presence of visitors need not interfere with the transaction of routine business and new matters could, if necessary, be considered at a special executive session after the scientific programme had been ended.

To recapitulate, there seem to be two main reasons for the existence of the Society—the first, to supply the demand for a clinical society where patients may be shown and papers, elaborate or simple, may be read without restrictions as to publication; and, second, to continue the organization of the Milk Commission. These are incentives which make the future look bright and furnish ground for the hope that the Philadelphia Pediatric Society will ever be a blessing to its members and through them to the community at large.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGAR.

DR. A. W. BINGHAM.

DR. HENRY HEIMAN.

DR. M. NICOLL, JR.

PATHOLOGY.

Morse, J. L.: Two Cases of Cirrhosis of the Liver in Infancy in Connection with Congenital Obstruction of the Bile Ducts.
(*Boston Medical and Surgical Journal*, January 24, p. 102.)

The first case was a female infant admitted to the hospital at three and one-half months. The child was apparently normal at birth, but never passed any colored meconium. The stools were always whitish in color. The skin became yellow when ten to twelve days old and the urine was greenish from a few days after birth. On admission to the Boston Infants' Hospital, there was found well marked jaundice of the skin, mucous membranes, and conjunctivæ. The lower border of the liver was felt from the right anterior superior spine to the left costal border in the nipple line. The surface of the liver was smooth, its edge a little rounded. No gall-bladder could be palpated. The spleen was palpable 4 cm. below the free border of the ribs. There was no ascites. The case ran an afebrile course while in the hospital, and the baby gained in weight.

After eleven days' stay in the hospital, the coagulability of the blood being apparently normal, as judged by the normal formation of fibrin shreds, an exploratory laparotomy was performed. The liver, on opening the abdomen, was found moderately enlarged, of a greenish bronze color, and elastic consistency. The gall-bladder was the size of the distal phalanx of a child's finger, and occupied the usual site of the cystic duct.

After the operation the child lost rapidly and died the same day from hemorrhage into the peritoneal cavity. The microscopic examination of the liver, obtained after death through the abdominal incision, showed cirrhosis of the liver, retention and inspissation of the bile pigment and dilatation of bile capillaries. The spleen gave evidence of slight chronic splenitis. The bile ducts were apparently normal, although no probe was passed into them.

The second case was likewise a girl, fourteen weeks of age at the time of admission to the hospital. She was normal at birth. Deep jaundice was noticed at six weeks of age and green urine from the first. The mother asserted that the stools did not be-

come white until the child was ten weeks old. At the time of admission, it was a small and poorly nourished baby with deep jaundice of the conjunctivæ, skin and mucous membranes. The lower border of the liver was palpable $1\frac{1}{2}$ cm. below the free border in the nipple line. The liver surface was smooth and the edge sharp. The gall-bladder could not be felt. The spleen was not palpable. The coagulation time of the blood, estimated by the Brodie-Russell apparatus, was six minutes, which was reduced in three days to one minute by giving gelatine solution and calcium chloride. Exploratory laparotomy was performed after a month's stay in the hospital, during which time the child's condition slowly grew worse. On opening the abdomen, the liver surface appeared granular, the organ was elastic and dark in color. The gall-bladder could not be found. The patient died the next day.

At autopsy, through the abdominal incision, no common bile-duct could be found, and a probe could not be passed through the duodenal papilla into the duct. The gall-bladder was seen as a small pea-sized cyst at the base of the normal fissure. It was not connected with any bile-duct. The microscopic changes in the liver were similar to those in the first case, but represented an older process. There was no history of syphilis in either case. The author justifies the operations on account of the absolutely hopeless prognosis, and the possible existence of a remediable condition, such as obstruction of the large ducts from pressure of the gland or inspissated bile or a congenital stricture. The author thinks that the pathologic findings in these cases did not justify any conclusion as to whether the changes in the liver were due to circulatory disturbances or to biliary obstruction.

HENRY HEIMAN.

MEDICINE.

Vipond, Albert E; The Early Diagnosis of Infectious Diseases by the Recognition of the General Involvement of the Lymphatic Glandular System. (*British Medical Journal*, December 15, 1906, p. 1,710.)

Examination of the lymph nodes in a series of cases of infectious diseases had led to the conclusion that the lymph nodes are enlarged in all acute infectious diseases. The enlargement varies with the period of incubation of the infectious disease, being greater the longer the incubation, excepting in the case of

acute symptoms. The axillary and inguinal lymph nodes are most affected, the left usually more than the right. The nodes vary in size from that of a pea to that of a filbert nut. They are tender, do not, as a rule, suppurate, and resolve in ten days to three months.

As soon as a child is exposed to, and contracts, an acute contagious disease, the poison enters through the tonsils and is carried at once into the lymphatic system; in three or four days the nodes begin to enlarge. When a local inoculation occurs, as in erysipelas and vaccinia, the absorption is at this point. In measles the glands enlarge seven to eight days before the rash and some days before Koplik's spots appear. In glandular fever the anterior and posterior cervical nodes are first enlarged, but the axillary and inguinal nodes are soon involved. In scarlet fever, chickenpox, rubella, mumps, diphtheria and whooping-cough the enlargement is more marked in the axillary and inguinal than in the other glands. It is more marked in measles and rubella than in scarlet fever and whooping-cough. In the latter the enlargement only occurs in the spasmodic stage. In diphtheria the injection of antitoxin hastens resolution of the glands. In erysipelas enlargement of the nodes is not present in children under one year.

Enlargement of the lymph nodes is caused by the absorption of the poison of the disease, which in all the infectious diseases, except those of local inoculation, most likely enters the system through the tonsils. As a rule, nursing infants do not contract infectious diseases readily, because the tonsils are small and inactive. The tendency to contract infectious diseases would be much lessened if the mouth and tonsils were kept in a healthy condition.

A. W. BINGHAM.

SURGERY.

Halstead, Th. H.: Brain Abscess Following Acute Otitis Media. Operation. Recovery. (*American Medicine*, October, 1906, p. 382.)

This is an extensive report of a case of severe brain abscess without mastoiditis, the infection being apparently along the sheaths of the lymphatics or veins. The abscess, about the size of an egg, was in the temporosphenoidal lobe. The patient was a boy eleven years old.

The interesting features of the case are as follows:—Nine days of moderate earache completely relieved by incision of the drum; the discharge ceased after four days and the drum healed. There was no headache and no brain symptoms until ten days after the incision, when the patient had an attack of dizziness, vomiting and slow pulse.

Two operations were performed: the first was an extensive mastoid operation, the antrum was opened and the lateral sinus exposed. The tympanic roof was opened and part of the squama removed; the brain was not explored. All this was done without finding anything definitely wrong. For the first twenty-four hours there was great improvement. This was followed by a convulsion. The second operation, which nearly proved fatal from hemorrhage, was performed about thirty-six hours after the first. The temporal ridge, with a piece of the squama three-fourths of an inch in diameter, was removed and the abscess opened, syringed and packed with iodoform gauze. The wound in the brain closed in thirty days and the mastoid one month later.

LOUIS C. AGER.

HYGIENE AND THERAPEUTICS.

Feuchtwanger, Dr. Alb.: The Feeding of Buttermilk Mixtures. (*Centralblatt für Kinderheilkunde*, December 1, 1906, p. 443.)

The so-called Dutch infants' food is recommended, made of sour cream, to which a pure culture of lactic acid bacilli has been added, and to a litre of the buttermilk thus obtained, 60 grains of sugar and 15 grains of wheat meal. The mixture contains about 2.5 per cent. proteid, 5 per cent. fat, and 3.5 per cent. sugar. On standing, it separates into an upper layer of whey and a lower containing the meal and casein. It is indicated when there is fat indigestion or difficulty in feeding ordinary cow's milk, in marasmus and for premature infants, in subacute and chronic gastroenteric disturbances, not due to carbohydrate indigestion, and in general eczema. When continued over a long period, it has not been shown to produce rickets or scurvy, but, on the contrary, it is regarded as useful in the treatment of the former. This same number contains a number of reviews by different writers on the subject of this dietary.

M. NICOLL, JR.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

SEPTEMBER, 1907.

[No. 9.]

Original Communications.

SOME POINTS IN INFANTILE TUBERCULOSIS.*

THE FREQUENCY AND MODE OF INFECTION IN PULMONARY TUBERCULOSIS.—A STUDY OF THE CEREBRO-SPINAL FLUID IN TUBERCULOUS MENINGITIS.

BY L. EMMETT HOLT, M.D.,

Professor of Diseases of Children, College of Physicians and Surgeons
(Columbia University), New York.

I. THE FREQUENCY AND MODE OF INFECTION IN PULMONARY TUBERCULOSIS.

The frequency of pulmonary tuberculosis in infancy has not yet been fully appreciated because we have not been accustomed to look for it with sufficient thoroughness. More careful application of our means of diagnosis has made possible the recognition of tuberculosis in very many cases where otherwise it is likely to be overlooked, and has emphasized the fact that pulmonary tuberculosis is a very common disease in infants.

The means to which I refer particularly are the systematic search for the bacilli in the sputum in children who are known to have been exposed to infection, and the tuberculin test. A consideration of the latter will be reserved for a later report.

During the nineteen months ending May 1, 1907, 67 cases of pulmonary tuberculosis were treated in the Babies' Hospital; 62 of these being infants under two years, and 15 under six months of age.

The diagnosis rested upon finding the bacilli in the sputum in 54 of the cases; upon postmortem findings in 10; and of the re-

* Read before the Association of American Physicians, Washington, May, 1907.

maining 3, one had tuberculous meningitis (bacilli found in the fluid drawn by lumbar puncture); one reacted to tuberculin, and the third gave typical clinical symptoms of pulmonary tuberculosis. In only one-half of these cases was there any consolidation in the lungs present at the time that the diagnosis was made, and in 9 cases there were no pulmonary signs whatever, the infants having been admitted for other conditions.

A demonstration of the tubercle bacillus in over 80 per cent. of these cases when, according to the physical signs, the disease was not far advanced, brings up the question of the different means employed in obtaining the sputum in infants. This has been assumed to be, if not impossible, at least a difficult and uncertain procedure. Infants do not expectorate, but cough up the bronchial secretion into the pharynx and swallow it. Sputum must therefore be obtained from the pharynx or the esophagus; to seek for the bacilli in the vomitus, as has been recommended, is almost a hopeless task. For a time we tried passing a stomach tube and staining the esophageal mucus which adhered to the tube on withdrawal. This was satisfactory in some cases, but in many others it was not, as the mucus from the esophagus was apparently rubbed off as the tube was withdrawn through the mouth.

The method at present followed, and the one which has given the most satisfactory results, is to excite a cough by irritating the pharynx, and then to catch the sputum brought up into view, upon a bit of gauze or muslin. The cough may be excited by a spoon or a tongue depressor, or better, by a small bit of muslin in the jaws of an artery clamp. Upon this the secretion is easily secured when it is brought into view by the cough. Muslin is better than gauze or absorbent cotton. Swabs prepared as suggested are placed by the child's bedside and, when the nurse notices a severe paroxysm of coughing, the child is picked up and, if possible, the sputum is obtained. Inversion during the paroxysm of coughing sometimes causes the infant to discharge a considerable mass of mucus into a sputum cup. By the procedure mentioned it has not been found more difficult to obtain good sputum for examination than in corresponding stages of the disease in adults.

The source of infection in many of the hospital cases which form the basis of this paper, it was, of course, impossible to trace. It is, however, interesting to note that a definite history of tuber-

culosis in one or other parent existed in 21 cases, and that in 6 others there was positive evidence of the disease in some other member of the household; and in 2 others there was a somewhat doubtful history of tuberculosis. Direct contagion would therefore seem to be the explanation of a very large proportion of the cases, it being shown in this series to have existed in at least 40 per cent. of the children.

For the past year it has been the custom at the hospital to inquire carefully into the family history of all children admitted, and, if there was any evidence or even a strong suspicion of tuberculosis in either parent, a careful and repeated search was made for bacilli in the sputum of the infant admitted. In some of these children there was evidence of a slight amount of bronchitis; in others no evidence whatever of pulmonary disease.

The results of this routine examination have been rather surprising. If one or other parent was affected with tuberculosis, it has been very exceptional not to find tubercle bacilli in the sputum of the children; in a few of the cases where these were not found a positive reaction to tuberculin was obtained. This emphasizes the fact that the infant is exposed to house infection more intimately than any other member of the household. The older children are away at school, or out of doors at play; while the infant is very apt to be in charge of the invalid who is ill at home, and hence its opportunities for infection are greatly increased.

The relatively insignificant and infrequent intestinal lesions seen in the tuberculosis of children seem rather surprising when we consider for how long a period and in what numbers bacilli are coughed up and swallowed. It would appear that the intestinal tract is not very vulnerable to tuberculosis at this period of life.

The foregoing observations tend strongly to confirm one in the opinion that it is direct contagion which is responsible for most of the tuberculosis of infants rather than infection through milk or other foods.

II. A STUDY OF THE CEREBRO-SPINAL FLUID IN TUBERCULOUS MENINGITIS.

The value of lumbar puncture as an aid to accurate diagnosis is now generally appreciated. It gives certainty in many irregular cases, where formerly tuberculous meningitis could only be sus-

pected. Considerable difference of opinion has been at times expressed as to the frequency with which bacilli may be found in the fluid drawn by lumbar puncture. The results obtained by inoculating guinea-pigs with the fluid, indicated that the bacilli were nearly always present, but the general opinion has prevailed that in a very large number of cases they could not be discovered by the microscope.

During the past fourteen months there have been treated in the Babies' Hospital 42 cases of tuberculous meningitis, in every one of which the tubercle bacilli have been found in the cerebro-spinal fluid. This is, I think, a larger series of consecutive cases than has previously been reported. It may, therefore, be assumed that the bacilli are always present, and that they can be found provided a sufficient degree of care is exercised in searching for them.

Some important points in technique have been developed in the course of this study which are of some assistance in finding the bacilli. In withdrawing the fluid it has been customary to remove all that flows readily and receive it in several tubes, since the bacilli are much more likely to be found in the last portion drawn than in the first; probably because they are present in large number in the brain and come down with the fluid last removed. The number of bacilli is not usually great, and careful search is necessary, but not more than is required in hunting for the bacilli in the sputum. The average time consumed in this series was about one hour; in 2 cases a search of five or six hours was necessary; in only 3 of the entire number were the bacilli present in such numbers that practically every microscopical field revealed them.

The time of puncture is of some importance. The bacilli were usually more numerous in late puncture than in those made in the early stages of the disease, although they were sometimes found with the very earliest symptoms. In this series they were found by the first puncture in 34 cases; by the second puncture in 6 cases; and by the third puncture in 2 cases.

The technique of search followed at the Babies' Hospital is as follows:—The fluid is allowed to stand in the test tube for twelve hours. If a film forms by the coagulation of fibrin in the fluid, this is fished out with a platinum loop and stained. Such film formation occurs in about half the cases, and in it the bacilli are

pretty certain to be entangled. If no film forms, the sides of the tube are scraped with a platinum loop. If the bacilli are not found in this way, the fluid is centrifuged. The chances of success after centrifuging are greatly increased by adding to the fluid one or two drops of blood. As a matter of routine, it has been found desirable to draw a single drop of blood with the very last fluid coming from the spinal canal. This is usually done by producing a slight movement with the needle before withdrawing it. The additional fibrin also aids the film formation and thus adds greatly to the facility of finding the bacilli.

Another procedure sometimes successful is to superimpose drops upon a slide. The first drop is placed and allowed to dry on; afterward a second one on the same spot, then a third, a fourth, and so on, and occasionally bacilli are found when their number is very small. Success depends largely upon the patience and cleverness of the observer.

The cells found in the cerebro-spinal fluid in tuberculous meningitis are generally few in number, and these are usually mononuclear cells. Only twice in the 42 cases were cells present in sufficient numbers to give a marked turbidity to the fluid. This is in striking contrast to the fluid seen in cases of cerebrospinal meningitis and in those of pneumococcus meningitis.

It has been believed by many that the absence of glucose is of importance in diagnosing meningitis from the normal cerebro-spinal fluid. Fehling's test was applied in 32 cases. The presence of sugar was demonstrated in 15, but it was absent in 17 cases. No conclusions could, therefore, be drawn from the reaction.

It has been our custom to seek for bacilli in the sputum in every case of tuberculous meningitis, no matter whether pulmonary symptoms existed or not. They were found in 22 of the 42 cases, although in only 5 of these was there any consolidation of the lung, and in 9 there were no signs whatever in the chest. In the remainder there usually was some general bronchitis, which in most cases appeared late, and was more probably not of tuberculous origin.

To Dr. Josephine Hemenway, house physician of the Babies' Hospital, by whom most of the laboratory work reported in this paper has been done, I wish to express my great obligation.

14 West Fifty-fifth Street.

CHYLOTHORAX IN CHILDREN.*

BY DE WITT H. SHERMAN, M.D.,
Buffalo, N. Y.

True chylous effusion, especially in the chest, is an exceedingly rare condition. There have been over 60 cases of chylothorax reported, 13 of which were in children. To 3 of these 13 cases I can find only references, and consequently they must be looked upon as doubtful cases.

G. G., a boy of four and one-half years, was noticed, on April 10, 1906, to be breathing with unusual frequency after going upstairs to retire. As the accelerated respiration was only of short duration, nothing more was thought of it till April 12th, when, after running, he had marked dyspnea with some cyanosis.

On April 13th he was taken to the office of Dr. A. H. Cooke. The boy looked and seemed so well at this office visit that the doctor saw no reason for stripping him, and a cursory examination of the chest, through his clothes, revealed nothing abnormal. On the morning of April 14th Dr. Cooke was called to the house, and found in the left chest an area of apparently consolidated lung, and suspected either an obscure, deep-seated pneumonia or a compressed lung. That evening, the fourth day of the illness, I was called in counsel. By that time the disease had sufficiently developed to make the diagnosis of effusion clear. The left chest was almost completely filled with fluid, crowding the lung high up into the apex of the chest cavity; pushing the heart to the right so far that the apex beat was one inch to the right of the sternum, with the cardiac dullness nearly to the right nipple line, and pushing the spleen down so that it was plainly palpable.

The respiration was 40 to 42 and labored; the color good, except upon coughing, which was of a gagging type and caused some cyanosis; the pulse was 136 to 140; no rise in temperature. Aspiration was done at once, and 840 c.c. (28 ounces) of a milky mixture was withdrawn, which, in the yellow light of natural gas, presented all the appearances of pus. Some little fluid was left, but so much was withdrawn that all the symptoms were relieved, the heart falling back into place and the spleen being no longer palpable.

* Read before the Academy of Medicine, Buffalo, February, 1907.

Preparations were at once started for operation for the next day, but were stopped as a result of the examination by my assistant, Dr. Harry R. Lohnes, who pronounced the fluid to be chyle.

The report by Dr. Lohnes was as follows:—

Appearance of liquid, milky; sediment slightly streaked with blood (probably from aspiration wound); odor not characteristic—cadaverous; specific gravity, 1.018; reaction, faintly alkaline; fat, 2.3 per cent.; biuret reaction present; does not reduce Fehling's solution; clears by adding sodium hydrate and shaking with ether.

Microscopical examination of the fluid showed occasional red blood cells; an occasional granular cell; a few lymphocytes; many fine granules the size of a micrococcus and having Brownian movement (fine emulsion of fat). The sediment of fluid stained showed many *lymphocytes*, fibrin, occasional polymorphonuclear leukocytes and epithelial cells. No tubercle bacilli were seen. Bacteria were very few in number.

Dr. Lohnes also made a blood examination which was as follows: Hemoglobin, 90 per cent.; red blood cells, 4,870,000; white blood cells, 9,000. Iodin reaction negative.

Differential count:—

Red blood corpuscles normal in size and shape.	
Polynuclear neutrophiles	63. per cent.
Lymphocytes	36.5 “ “
Eosinophiles .....	.5 “ “

Chemical urine analysis was negative, except chlorids were diminished to .5 per cent. Microscopical urine analysis was negative, the only crystals being those of calcium oxalate.

No light was thrown on the case from the family history, for it was negative as far as tuberculosis, cancer, syphilis, or other taint is concerned.

The examinations showed that there was no inflammatory process; probably nothing tuberculous or cancerous; that the cause of the escape of chyle into the left chest was probably a perforation of the thoracic duct or one of its branches. This conclusion naturally would lead to the thought of an injury, of which there was no history, except that in the first part of March, one month before we saw him, the boy fell backward down a few stairs.

Later in the case a blood examination was made at night to search for the filaria. It was not found.

The second blood count was: Hemoglobin not taken; red blood cells, 5,160,000; white blood cells, 10,850. Iodin reaction negative.

Differential count:—

Polynuclear neutrophiles	53 per cent.
Lymphocytes	44 " "
Eosinophiles	3 " "

Reds normal in size and shape. Filaria not found.

The *treatment* was speculative and what seemed to us logical, most of the literature in our possession not even mentioning the condition. His diet was fat-free as far as possible: meat, potato, water, occasional egg; the fluids were limited to the fullest extent to decrease the fluids of the body; the bowels were kept fluid and free to further reduce blood pressure. This was taken regularly at least twice daily, and kept below 90, if possible. It ranged from 84 to 94.

In spite of our treatment, by April 19th, five days after the first aspiration, the chest was well filled again, and the urgent symptoms and signs had recurred and a second aspiration was necessary. At this time we drew out only 600 c.c. (20 ounces), enough to decidedly mitigate the symptoms, but still leaving enough in the thoracic cavity to maintain back pressure, with the hope of preventing further leaking.

As fibrin was found microscopically, with the hope of increasing its production and its ferment, and thereby closing the probable rupture, we gave calcium chlorid .18 (grain iii) at short intervals for a couple of days, and then gelatin .18 (grain iii) in the same way, and two days later, apparently not getting results, gave them both together for two days.

By April 24th, five days after the second aspiration, and ten days after the first, the urgent symptoms and same signs had recurred, but aspiration was delayed with the hope of securing so much back pressure that there could not be any leaking. By the next day, April 25th, the symptoms were most urgent, respiration being 56 and very labored; color, pale and often cyanosed; pulse, 160 and over. The apex beat was at the right nipple line, and the cardiac dullness extended one finger-breadth to the right

of the right nipple line, giving a heart more than transposed. The spleen was down farther than on the two previous occasions, and the liver was now pushed down to one-half inch above the umbilicus. The right lung was somewhat compressed, giving in the displaced cardiac region and toward the apex of the right chest, an impaired percussion note and bronchovesicular breathing. We had tried back pressure and reducing blood pressure for eleven days without avail, and had twice observed that the end filling of the chest seemed to be more rapid than earlier. Reasoning that possibly the very labored chest excursions were acting as an aspirator, drawing the chyle into the thorax, we decided at the third aspiration to draw off all that was possible and note results. The needle was inserted into the eighth or ninth interspace, the boy tilted to that side and the chest emptied as completely as we could. We withdrew 1,200 c.c. (40 ounces).

Before aspiration the blood pressure was 110, afterward 90. The relief of the symptoms was great, and the boy at once fell asleep. Fortunately there was no recurrence, and though the fluid remained for a few days at the height of the puncture, which was at about the level of the liver dullness on the right side, it soon began gradually to subside, and after two or three weeks had disappeared.

He is now, eleven months later, in fine health.

The sample from the first aspiration was analyzed at my office; that from the second aspiration by Dr. Herbert M. Hill, and that from the third aspiration by Dr. Chas. A. Fife, of Philadelphia.

The first sample showed 2.3 per cent. fat, by Leffman and Beam tubes.

The second sample showed the following:—

Specific gravity	1.015		
Total solids	7.10	per cent.	
<i>Fat and cholesterin</i>	1.82	"	"
Total albuminous matter	3.94	"	"
Alkali albumin	none		
Albumin precipitated by heat and acid ..	3.56	"	"
Albumoses	0.12	"	"
Lecithin calculated from P_2O_5	0.38	"	"
Ash	0.75	"	"
Sugar	none		

Dr. Chas. A. Fife's analysis of the third aspiration for Dr. J. Crozer Griffith was as follows:—

Specific gravity	1.015
Reaction	neutral
Water (estimated by loss of weight at 100 C.)	93.71 per cent.
Total solids (after evaporation at 100 C.)	6.29 " "
Ash .....	.0245 " "
Total fats (Leffman and Beam)	1.6 " "
Total proteids (Kjeldahl method)	4.022 " "
Albumin (heat and acetic acid coagula, thoroughly washed with hot water, alcohol and ether)	1.808 " "
Serum globulin	abundant
Sugar	none

Dr. Fife's microscopic examination corresponds with ours, except that his sample was contaminated. He found no tubercle bacilli. Some of the third sample was given to Dr. Chas. A. Bentz, who reported the fluid germ free by culture and by inoculation tests.

It is interesting to note the progressive fall of fat percentage as a probable result of the diet. First, aspiration fat was 2.3 per cent.; second, 1.82 per cent., and third, 1.69 per cent. The boy, in health, partook of a very full and varied diet, and was in excellent condition before this illness. I think this accounts for the high fat in the three samples.

A standard for human chyle has not yet been positively established. Most of the analyses are from animal experiments, or from human beings, many of whom were suffering from some pathological condition which might easily alter the chemical composition of the chyle.

The largest number of cases reported of chylous effusion are of chylous ascites, and the changes in the effusions possible, first, from the admixture of the serous fluids so commonly poured out in peritoneal involvement and, second, from the opposite occurrence, that of the absorption of some of the fluid constituents by the peritoneum, present an unknown quantity for error in the analyses. This same error is probable in chylothorax.

Concerning the Character of the Effusion.—Milky effusions¹

are not unusual, but white or creamy effusions are rare. They are divided into three classes, viz.:—

- (a) Chylous, or true chyle.
- (b) Chyliform.
- (c) Latescent, or non-chylous.

The latescent, or non-chylous, are milky, due, probably, to emulsionized albumin. The chyliform may have this emulsionized albumin as a base, but added to it is the fat from fatty degenerated cells. The chylous effusion, or true chyle, gets its color from an extremely fine emulsion of fat. The granules of albumin and fat are much coarser in the chyliform or adipose effusions than in the chylous.

Bussey² gives an accurate definition of a chyliform effusion, viz., “a milky fluid occurring as a morbid product, and unattended by any blockage or distention of the chyle or lymph vessels.”

Letulle³ is sweeping in his statement, holding that chylous and adipose effusions are always formed from an inflammatory condition of the serous membrane; that in all cases, products of serous or purulent inflammation are slowly transformed by leucocytes into a granulo-fatty emulsion, and are, consequently, instances of chronic tuberculous, cancerous or neomembranous peritonitis. This theory may be true more often in the milky abdominal effusions, but is untenable in many cases of chylothorax, especially if due to trauma. His cases studied were probably chyliform effusions.

J. F. Bell⁴ states that “in the true variety of chylous effusions the fat cells are small and finely granular, and there is marked absence of large fat cells, while in the chyliform variety the larger fat cells predominate, and in case of a malignant growth, which may give rise to this condition, cancer cells may be found.”

Munich and Rosenstein¹ state that a distinction between chylous and chyliform effusions cannot be made microscopically. They state that fat, easily digested, gives, as a rule, small fat drops, and fat, difficult of digestion, gives larger and fewer fat drops. A marked difference is that chyliform effusions do not clear by the addition of alkali and shaking with ether, as do chylous effusions.

Concerning the Escape of Chyle.—*The Reference Handbook of Medical Sciences*, of 1904, records 47 cases of genuine chylothorax, besides 15 other doubtful cases.

Of the undoubted cases the causes are as follows:—

1. Injury	16
2. Pressure from new growths outside or by tuberculous lymph nodes	9
3. Secondary growths in duct.....	9
4. Thrombosis left subclavian vein.....	4
5. Perforating lymphangitis.....	2
6. Aneurismal-like dilatation of duct.....	2
7. Thrombosis of duct.....	1
8. Operation for removal of carcinomatous lymph nodes of neck.....	1
9. Obstruction to radicals of duct from in- flammatory thickening of mesentery....	1
10. Mitral disease.....	1
11. Filaria	1
<hr/>	
Total	47

All these produce a break in the duct walls and allow an escape of chyle, or so affect the nutrition of the walls that there is a transudation of chyle.

Some authors state that the rupture in the duct or its branches must be found before the effusion can be called true chyle, even if the duct is found blocked.

As to the results of experimental ligature of the thoracic duct, Kamienski¹ points out that, because we find the thoracic duct blocked in a case of milky ascites, it is not correct to infer that the duct or one of its branches has been ruptured. It may be a transudation. In corroboration of this, Schmidt-Mulheim tied the thoracic duct in a dog in a most complete manner, securing, as well, all the cervical and both the subclavian veins. On the sixth or seventh day the dog, which was in excellent condition, was killed. Milky fluid was found around the thoracic duct, in the chest and abdomen, but injections of the chyle vessels with Berlin blue failed to reveal the rupture, though four times the normal pressure was used. Regarding the escape of chyle through a rupture, Boegehold tied the duct in a dog, opened one pleura and ruptured the duct. Three days later no milky fluid was found in the pleural cavity, and the rent had contracted to a small hole. From this experiment it would seem that mere

blockage of the thoracic duct would be insufficient to cause necessarily the escape of chyle, even with the rupture ready made.

It is not, then, essential for diagnosis to demonstrate the actual rupture of the duct or one of its branches. Actual rupture has rarely been demonstrated. It is claimed⁶ that chyle is not always poured out immediately after trauma, but no satisfactory explanation is given for this delay. Were this statement true it might apply to our boy, whose symptoms did not manifest themselves for four weeks after his fall.

Concerning the Fat Percentage.—The fat percentage should be fairly constant in the series of aspirations in true chylous effusion.

That the fat percentage can be affected by the diet is shown by Straus's case of chylous ascites due to carcinoma. He gave milk and butter in abundance, and the odor of butter was perceptible in the fluid the next day, and the fat was increased threefold.

Moskowski, to demonstrate the elimination of fat, not in the blood, gave eruca acid. In the next aspiration he found the glycerid of this acid, and the erusin increased.

If some special fat is introduced into the body and found later in the effusion, it is proof positive that it is a chylous exudate. This test we neglected to try in our case.

It is claimed that the percentage of fat in true chylous effusions should be 0.9 per cent. or thereabouts. As the fat percentage in my case ran so much over, I have studied the percentages, when given, in 26 cases. Some authors give the percentage for fat alone and others for fat and lecithin combined. I chart these percentages for convenience.

Percentage of fat, or fat and lecithin combined, in analyses given in 122 cases of chylous effusions:—

Under	1 per cent.	4 cases	7 samples
1 to 1.50	" "	6 "	8 "
1.50 to 2.00	" "	5 "	6 "
2.00 to 3.00	" "	2 "	2 "
3.00 to 4.00	" "	4 "	5 "
Over 4.00	" "	5 "	5 "
		—	—
		26 "	33 "

Same percentages in chylothorax:—

Under	1 per cent.	3 cases	5 samples
1 to 1.50	" "	2 "	4 "
1.50 to 2.00	" "	3 "	4 "
2.00 to 3.00	" "	2 "	2 "
3.00 to 4.00	" "	4 "	5 "
Over 4.00	" "	1 "	1 "
			—	—
			15 "	21 "

The different percentages of fat in true chylothorax are undoubtedly due to the physical condition of the patient, and are greatly influenced by the diet. In my case the fat, as stated, fell in five days from 2.3 per cent. to 1.82 per cent., and in six days more to 1.69 per cent. Kamienski reports the one case of fat as high as 4.75 per cent. In the chyliform effusions the percentage has been found, according to Hasebrook, as high as 10 per cent. to 19 per cent. Landois, in an executed person, found the fat to be 0.9 per cent. Prison diet may have been an influencing factor in regulating this percentage.

Concerning Sugar as an Ingredient.—Burgebuhr states that for an effusion to be chylous it must have been effused rapidly and should contain fat and sugar. Senator thought that, excluding diabetes, the presence of sugar was proof of its being chyle, but admits that its absence is not equally significant. When sugar is more than 0.02 per cent. it is probably chylous. The amount of sugar, if present, is probably the same as in the blood, *i.e.*, 0.05 per cent. to 0.09 per cent. The statement that all chylous abdominal and pleural effusions must contain sugar is disproved by Neuenkirchen, Martin, Czerny and others.

Some substances in the effusions sometimes reduce Fehling's solution, but fail to show sugar by the fermentation test or the polarimeter. Sugar may come from associated pathological conditions, as in a case of simple ascites, reported by Moscatelli, in which 0.15 per cent. sugar was present. Sugar may be present and disappear later. Its presence has not been detected in much more than half the cases of chylous effusion, according to Beebe.⁷ As the largest number of cases in which it has been found were abdominal, the liver and its lymphatics, as in Moscatelli's case, may have been a factor in its production.

Bayer gives three good reasons why sugar may not be found:—

First, the exudate is so old that the sugar has been reabsorbed.

Second, another exudate can mix with the chylous effusion, and so dilute the sugar that it cannot be determined.

Third, often only small samples are given for chemical tests.

The specific gravity of the chylous effusion varies from 1.005 to 1.026.

The predominating and so-called characteristic cell in true chylous effusion is the lymphocyte,⁸ while in the chyloform effusions the leukocyte is more common. According to Mutter-milch the cellular elements are few in chylous exudates and abundant in exudates due to fatty degeneration, *i.e.*, chyloform exudates.

Albuminous constituents, according to Raschelles and Reichel, have no significance in these effusions, as all exudates and transudates contain albumin.

The true chylous effusion upon standing separates into layers, the creamy layer on top. Titration easily mixes these layers. If it stands for a long time (*i.e.*, two to four weeks), especially at room temperature, it forms into a large mass, a coagulum. This is fairly easily broken up by shaking. If the sample is kept cold this agglutination of fat occurs much more slowly, in my sample not occurring for months.

The reaction of chylous exudates is ordinarily alkaline or neutral, but Rotmann reports a case in which it was acid.

To be chyle the milky effusion should satisfy the following requirements:—

1. Should get its color from a minute emulsion of fat.
2. Should clear by addition of sodium hydrate if shaken with ether.
3. Should show unusual fats introduced into the body.
4. Should have a similar fat percentage in several aspirations.
5. Should contain few cellular elements, the dominating cell being the lymphocyte.
6. Should contain lecithin and cholesterin.

If sugar is present in the amount of .05 per cent. to .09 per cent., and if the rupture is found in the duct, the diagnosis is all

the more positive, though these last two qualifications are not necessary.

The largest amount that I can find, which was aspirated from one adult during an illness, was 29,500 c.c. (59 pints). The largest single aspiration, 4,800 c.c. (160 ounces). These, though, were undoubtedly abdominal effusions.

Concerning Prognosis.—As pointed out by Branchi and confirmed experimentally by Schmidt-Mulheim and others, and clinically by Erbs, Renvers and Day, internal rupture of the thoracic duct is not always fatal. The prognosis is more grave if the rupture is in the chest. The prognosis does not seem to depend on the amount of the effusion.

Of the 11 undoubted cases of *chylothorax* 4 died, 5 recovered, 1 improved, and the result was not stated in 2 cases.

It is stated that injuries to lymph vessels, not accompanied by infection, heal kindly, on account of the low pressure, and that the prognosis is better in rupture from trauma than in transudation from mural disease. Perfect recovery^s has been shown even though there was a complete transverse lesion of the duct. Large wounds heal by granulation and small ones through contraction.

Dr. Francis Munich^o says that the thoracic duct is more commonly affected from trauma in the lower half, and that though the rupture is more often on the right side, there being less resistance to the left, the effusion is more often found in the left chest.

Treatment.—As for treatment it is expectant, unless the rupture can be reached and treated surgically.

Aspiration is absolutely necessary to save life. In our case we inferred that the very large amount withdrawn, by allowing all the thoracic organs to adjust themselves to their normal positions, accomplished something. The accepted method, though, seems to be to aspirate as little as possible, thereby maintaining high back pressure.

Kirchner, in his child of nine, followed this method. He aspirated, drew off 1,000 c.c., and on the next day, in spite of dyspnea, he postponed operation. Suddenly the difficult respiration ceased and the fluid was absorbed. We tried this without result.

Port resected the seventh rib in his case. The man beginning to fail, he tamponed, and was finally successful in closing the wound. The man recovered.

Bassins⁹ resected, the effusion dripped for three weeks and the man died.

Hoffman⁹ resected for chylous effusion. There was a chylous discharge for ten years, but whether it came from the thoracic duct or from the intercostal blood vessels, which are supposed to carry some chyle, he did not make clear.

Langbein⁵ mentions 13 cases of traumatic chylothorax, and adds 1 of his own.

In 13 of these cases the effusion was in the right chest nine times, in the left chest twice, and on both sides twice.

SUMMARY:

(1) Apparent late appearance of effusion after accident, which was supposed to be the cause.

(2) Fat percentage higher than that generally accepted for chyle.

(3) Absence of sugar does not necessarily preclude the effusion being chyle.

(4) Complete aspiration seemed of avail.

(5) Percentage of recoveries in children, 45 per cent. to 55 per cent.

I wish to express my appreciation of the valuable assistance rendered to me in the preparation of this paper by Dr. Herbert M. Hill, Dr. Harry R. Lohnes and Dr. Charles A. Bentz, of Buffalo, and Dr. Charles A. Fife, of Philadelphia, and to Dr. A. H. Cooke, of Buffalo, for allowing me to report the case.

A tabular statement of the reported cases in children under fourteen years is given on the following page.

680 W. Ferry Street.

REFERENCES.

1. Shaw. *Journal of Pathology and Bacteriology*, 1900.
2. Busey. *American Journal of Medical Science*, 1889, Vol. XCVI., p. 563.
3. Letulle. *Reference Handbook of Medical Sciences*, 1901.
4. Bell. *American Medicine*, 1905.
5. Langbein. *Inaug. Dissert. für der Hohen Med. Fac. der Leipsic Uns.*, July, 1904.
6. Francis Munich. *La Semaine Médical.*
7. Beebe. *American Medicine*, 1905.
8. Widal & Merklen. *La Press Médical*, 1900.
9. Weischer. *Dent. Zeitschrift für Chir.*, 1893-1894, Vol. XXXVIII.

REPORTED CASES OF CHYLOTHORAX IN CHILDREN UNDER FOURTEEN YEARS OF AGE.

NAME	AGE	CAUSE	LOCALITY	SYMPTOMS	RESULT	TREATMENT	ASPIRATION	REMARKS	REFERENCE
1 Philipoff	18 months	Following pneumonia, probably tuberculous, with a caseating gland opening thoracic duct	First day, right side; second day, left side		Death	Resection			Prakt. Urach. Paterl, 1904, Vol. 3
2 Kirchner	Girl, 9 years	Thrown against window fourteen days before; fracture third rib	Right side	Pain & dysp. 8 days; again 10th; asp. delayed; fld. absorbed	Recovery		9th day, 1000 cc.		Langenbeck's Archiv., 1886, Bd. 32, S. 156
3 Rudolph and Langbein	Boy, 9 years	Fell from swing and was crushed by returning swing	Right side		Recovery in 2 months		5th day, 900 cc., then 750 & 1200; bloody? milky		Inaugural Address Faculty, Leipsic, July, 1904.
4 Letulle	Boy, 2 years & 8 months	Probably syphilitic (liver disease)	Bilateral		Recovery	Aspiration	Four aspirations, 1300 cc.		Revue de Méd., 1885, p. 960
5 Muttermilch	5 months	3 weeks before fell from bed & struck top of crib; for 14 days seemed well			Probable recovery				Zeitschrift für Klin. Med., 1902, 46, S. 122
6 Soyenti, Rome	7 years	Probably tuberculous ulcer on lymph vessels	Right side		Recovery in 10 months				
7 Letulle	Boy, 8 years	Ac. rheum. fever; mitral disease; liver enlarged; double chylothorax	Double		Died		Asp., 2000 cc.		Revue de Méd., 1884, p. 722
8 Morton	Boy, 2 years	Compression of thoracic duct by gland, with rupture of lymph vessel			Died		Asp., 3500 cc.	Post mortem. Estu-sion also in abdomen	Morton's Phys., 1705, Lib. I., Cap. 10, p. 21
9 Whitla	Boy, 13 yrs.	Miliary tuberculosis; thoracic duct in lower $\frac{1}{4}$ enlarged and perforated; resect. chylifame			Died		Asp., 1875 cc. in 3 months	Rupture of duct found	British Med. Journal, July, 1885, Vol. I., p. 1089
10 Cartier Anal. by C. A. Lovett	Girl, 8 years	Trauma							British Med. Journal, July, 1902
11 Sherman Anal. by H. M. Hill	Boy, $4\frac{1}{2}$ years	Probably a fall down a few stairs a month before	Left side	Dyspnea and cyanosis	Recovery	Asp. Ca Cl ₂ gelatin; lower blood pressure	1st. 840 cc. 2d. 600 cc. 3d. 1200 cc.	Thorough asp. seemed of avail	

Three doubtful cases: No. 12. By Newcombe, 9 years; No. 13. Newcombe, boy of 2 years, and No. 14. Smith, 9 years.

SYMPTOMS OF TYPHOID FEVER IN INFANCY AND CHILDHOOD.

BY OGDEN M. EDWARDS, JR.

Typhoid fever is an acute infectious disease caused by the entrance into the body and proliferation there of the bacillus typhosus. It is characterized by certain pathological changes in the body which produce a sequence of clinical phenomena more or less constant.

The disease is found in infancy, in childhood and in adult life. Its occurrence is less frequent in infancy than in childhood, in childhood than in adults. The type of the disease in childhood differs from that found in adults. In infancy the difference is still more marked. In general, the younger the patient the less closely do the symptoms resemble the symptoms as found in adults.

It is the object of this paper to describe some of the symptoms of typhoid fever that are found in infancy and childhood. These symptoms depend upon two principal factors: first, the vital activity of the typhoid virus and its effects upon the body; and second, the individual reaction of the patient.

The fetus may be infected from the mother. When this occurs it generally dies in utero and is expelled, or it may be born alive and well, having escaped the infection, or it may be born suffering from the infection. These infants are weak and feeble, the disease showing itself in the form of an acute cachexia without any special characteristics. The Widal test may be positive and typhoid bacilli may be demonstrated in the blood cultures. The mortality of these cases is high.

The incubation of typhoid fever is stated as being from five days to three weeks.

Typhoid fever occurring under two years is a rare disease. How rare it is, it is impossible to say. It is probable that it is more frequent than is generally supposed, because, in the first place, sucklings and young infants are brought to the hospitals less frequently than older children; and secondly, because cases treated outside may often not be recognized on account of the difficulties in making the diagnosis.

The onset of the disease in infants under two years may be acute or gradual. An acute onset is more commonly observed here than with older children and probably occurs as often as the gradual onset. The younger the infant the more likely is the onset to be acute.

In a series of 180 cases of typhoid fever in children under fifteen years of age, collected from records of the Western Pennsylvania Hospital and the Pittsburgh Hospital for Children, 2 cases were recorded under two years of age. One was fourteen and the other thirteen months old. Both of these cases were of gradual onset.

The duration of the disease is shorter in infants than in older children. In the above cases one was fourteen days and the other was twenty-three days. The initial febrile period is short, infants offering less resistance to the typhoidal poison. The fastigium is sooner reached and the temperature is usually higher in this period than in older children. In one of the cases the highest temperature— 105.8° —was reached on the seventh day. In the other one, 104.8° was the highest temperature, occurring on the sixth day. The remittent type of fever is often observed in infants. The pulse is rapid, but generally not markedly so. Rose spots are less often found than in older children. The spleen is almost invariably enlarged. Meteorism is not often present, and is seldom marked. Diarrhea appears much more constantly than in older children. Diarrhea was present in both of the above cases. Frequent small watery stools is the rule. Vomiting is often present, particularly at the beginning of the disease.

Anorexia is not so pronounced as in childhood. Convulsions, twitchings or restlessness may mark the beginning of the disease, to be replaced later by stupor or coma. Rigidity of the muscles of the back and opisthotonos are not uncommon. Bronchitis is not so frequent as in later years, but bronchopneumonia is more frequent. Hemorrhage and perforation are exceedingly rare. Recurrences and recrudescences are more common and complications rarer than in childhood.

In childhood the onset may be acute or gradual. An acute onset is seen more frequently here than in adults. In 36 per cent. of Morse's cases the onset was acute. In the present series of 180 cases, between two and ten years, 29 per cent. were acute and 26 per cent. between ten and fifteen years.

Stork says that those cases which begin acutely take a shorter

and more favorable course than those which begin typically. It could not be demonstrated, however, from the present series of cases, that this statement was true.

In cases with sudden onset

between	2	and	5	years	the	average	duration	was	17	days.
"	5	"	10	"	"	"	"	"	18.5	"
"	10	"	15	"	"	"	"	"	25.2	"

In cases with gradual onset

between	2	and	5	years	the	average	duration	was	15	days.
"	5	"	10	"	"	"	"	"	21	"
"	10	"	15	"	"	"	"	"	23.5	"

The course of the disease is shorter in childhood than in adults. Earl puts the average at twenty-six days, Henoch at eighteen days and Morse at three weeks. In the present series of 180 cases the duration was 20.2 days. Any statistics on the duration of the disease must be more or less inaccurate because of the difficulty in learning the exact date of the onset.

The temperature curve generally pursues a somewhat lower course than in adults, but it may be high, producing, however, less severe symptoms than are seen in adults with the same amount of fever. The early rapid rise and remittent type of fever are more common the younger the children. In the present series the average highest temperature was:—

between	2	and	10	years,	103.4°,	reached	on	the	10th	day.
"	10	"	15	"	103.7°,	"	"	"	12th	"

The highest temperature recorded in the uncomplicated cases was 106.4°.

In females the temperature is higher than in males. The fever ends by lysis generally, but may end by crisis. Defervescence is rapid. An inverted temperature curve has been rarely noted, with the highest temperature in the morning and the lowest in the evening.

The pulse is accelerated, but is low in comparison with the pulse as found with the same temperatures in other diseases.

The average highest pulse between two and five years was 128. The average temperature taken at the same time was 103°. The average highest pulse between five and ten years was 131.1. The average temperature taken at this time was 101.7°. The

average highest pulse between ten and fifteen years was 127. The average temperature at this time was 103.4°. The highest pulse noted in the uncomplicated cases was 140. The highest pulse was observed to occur generally after the highest temperature had been reached, most often from one to seven days afterwards.

Micritism is only rarely encountered in young children. It is more frequent in older children. Hemic murmurs are not uncommon in older children. They disappear during convalescence.

Morse found systolic murmurs at the apex in 10 per cent. of his 284 cases.

Cardiac weakness is much less common than in adults. The heart, more than any other organ, shows a marked resisting power to the typhoidal poison. Weakened heart action, however, has been noted in long cases and during convalescence.

Typhoid bronchitis is common in childhood and is generally an early symptom. Curschmann says that it is one of the most valuable of the diagnostic symptoms. Morse found it in 40 per cent. of his cases. In the present series it occurred in 72 per cent. of the cases between ten and fifteen years, and in 46 per cent. of the cases between two and ten years.

The tongue in childhood seldom becomes dry. It is generally moist and coated, with the edges and tip red. Abdominal distention is common, but is generally so only in a moderate degree. Henoch observed marked tympanites in only 6 per cent. of his cases, while 69 per cent. showed moderate meteorism.

Tympanites is observed more frequently in older children. In the present series it was observed in one of the 2 cases under two years of age.

In 50% of the cases, between 2 and 5 years.

" 70% " " " " 5 " 10 "

" 79% " " " " 10 " 15 "

Abdominal pain is frequently seen and may be of extreme severity. It was observed in 23 per cent. of the cases. Abdominal tenderness is common and was noted by Morse to occur in 43 per cent. of his cases. It is more common in older children. Between two and ten years it occurred in 10 per cent. of the cases, while from ten to fifteen years it was observed in 40 per cent.

Vomiting is observed more often in children than in adults. It generally occurs in the early part of the disease. It is often the first symptom when the onset of the disease is abrupt. Morse

says its occurrence does not affect the prognosis unfavorably. Vomiting was noted as occurring late in several of the severer cases of this series, and in one fatal case the child was unable to retain any food for three days before she died.

Diarrhea is a more constant symptom in children than in adults. In 287 cases collected by Earl and Henoch, 203 cases had diarrhea. Morse and Forchheimer found that constipation was the rule. Holt says that diarrhea occurs in about 50 per cent. of the cases. In both infants under two years observed in our series, there was diarrhea; between two and five years 45 per cent. had diarrhea; between five and ten years 40 per cent. had diarrhea; between ten and fifteen years, 48 per cent. Diarrhea was present in all but 1 of the fatal cases. Diarrhea in many cases was followed by constipation later on in the disease.

Intestinal hemorrhage is very rare. Holt collected 946 cases in which it occurred in 3 per cent. Biedert found it in 4 per cent. of 435 cases. It occurred in 4 of the cases of the present series. All of these had diarrhea.

Intestinal perforation is even more rare than intestinal hemorrhage. It occurred in 2 of the present series. Both were operated upon. One recovered. One of these cases had hemorrhage.

Splenic enlargement is common. The spleen is almost invariably found enlarged by the end of the first week and is recognized by palpation. In the present cases the spleen was found enlarged more frequently in children under five. Morse found enlarged spleens in 60 per cent. of his cases. In the present series they were found in 40 per cent. of all the cases. They were present oftener than this, but their occurrence was not noted in the histories.

The appearance of the eruption does not differ from that seen in adults. It appears first near the junction of the lower border of the thorax with the mammary line. It may be profuse, but is generally less profuse than in adults. It appears generally in the second week and it may return in successive crops.

Epistaxis is less common in children than in adults. It is less common in younger than in older children. In children under ten years it was observed in 2.2 per cent. of the cases; between ten and fifteen years it occurred in 7 per cent. of the cases.

Headache is generally of a mild type, but it occurs frequently, especially in the early part of the disease. In children between

two and five years it was found in 11 per cent. of the cases; between five and ten years in 43 per cent., while between ten and fifteen years it was noted in 67 per cent. of the children.

Nervous symptoms usually vary with the severity of the attack. Marked nervous symptoms are present in about one-fourth of the cases.

A mild delirium was present in 12 per cent. of the present series. Stupor is rare, even in the severest cases. Apathy is characteristic of typhoid in childhood. Convulsions may be the initial symptom in an acute attack. They occur less rarely during the course of the disease.

Cerebral symptoms, simulating those of meningitis, are not infrequent in younger children. Exaggerated knee-jerk, ankle clonus and Kernig's sign may be observed.

Transitory aphasia is more common in children than in adults, occurring almost exclusively in childhood.

Febrile albuminuria is distinctly less common than in adults. Biedert found albumin in 40 per cent. of his cases. Acute nephritis is rare.

Loss of weight is more frequently seen in children than in adults, but it is not so marked. In prolonged cases, however, there may be extreme emaciation. The maximum loss of the body weight was 9 per cent., as noted by Curschmann, in children, and 32 per cent. in adults. The return to the former state of nutrition is generally rapid, and often an increase beyond the former body weight is noted.

The tendency to relapses and recrudescences is more pronounced than in adults. Relapses occurred in 19 per cent. of Curschmann's cases. In the present series they occurred in 13 per cent. Sixty-six per cent. of the relapses followed moderately severe cases. Twenty-two per cent. followed severe cases and 11 per cent. were seen after mild cases. Eighty-nine per cent. of these relapses were constipated during the primary disease. The relapses occurred from two to sixteen days after the primary disease and their duration varied from ten to twenty-eight days. The average was fifteen days.

COMPLICATIONS AND SEQUELÆ.

Complications in childhood are infrequent and mild.

Laryngeal affections are less frequent than in adults and in younger than in older children.

Bronchitis is common. Bronchopneumonia occurs in from 5 to 9 per cent. of the cases. Lobar pneumonia is rare. Pleurisy and empyema are also rare. Neuritis occurred in 2 per cent. of Morse's cases.

Chorea is not a rare sequela. Coma vigil and subsultus are rarely seen. An impaired mentality has been noted in children recovering from typhoid. Pericarditis and endocarditis are seldom found. Myocarditis is more common. Otitis media occurred in 12 per cent. of Morse's cases. Parotitis is one of the rare complications. It occurred in 1 of the fatal cases of the present series. Furunculosis occurs in about 7 per cent. of the cases during convalescence. Suppuration of the bones and joints is rare. Bed sores are less common than in adults.

DIAGNOSIS.

During the first few days of the disease a positive diagnosis is impossible. A tentative diagnosis may be made from the history, the symptoms and the blood count. Leukopenia is the rule in the early stage of typhoid, and as there is a well-known tendency to a leukocytosis in early life on the smallest pretext, any reduction in the white corpuscles is very suggestive of typhoid fever. A positive diagnosis depends on the agglutination test or the demonstration of typhoid bacilli in the blood or excreta.

The Widal test shows positive in from 95 per cent. to 98 per cent. of all typhoid cases. It is positive generally as early as the end of the first week. In 1 case of our series it was positive on the sixth day. Tests made during the course of the disease may be negative and a positive test only obtained during convalescence.

The Diazo reaction is found in other diseases of childhood, but when found positive with other positive symptoms it helps to substantiate the diagnosis. It was found positive as early as the fifth day and as late as the thirty-fifth day. Again it was positive on the eighth day and absent in the same case on the twenty-seventh day.

The typhoid bacilli may be demonstrated fairly early in the blood and when found are proof positive of the disease.

In the absence of any help from the laboratory, a positive diagnosis is only justifiable if the case shows an enlarged spleen, roseolæ, abdominal symptoms and a continued fever. Typhoid

fever may have to be diagnosed in children from the following diseases:—

Febrile gastroenteric diseases.

Tuberculous and epidemic cerebrospinal meningitis.

Acute general miliary tuberculosis.

Malaria.

Influenza.

Pneumonia.

The exanthemata.

The mortality of typhoid fever in children taken from 2,117 cases collected by Morse from the literature was 6.4 per cent. The mortality in the present series* of 180 cases was $3\frac{1}{2}$ per cent. All the deaths occurred in children over ten years.

The prognosis in children is good. In infants, however, under two years, the prognosis is graver the younger the infant. In children over two years the prognosis is better the younger the child.

* This series represents :

Under	2 years.....	2 cases.
Between	2 to 5 "	26 "
"	5 to 10 "	67 "
"	10 to 15 "	85 "
Total.....		180 cases.

A Clinical Test for Fat in the Feces.—Hecht describes the following procedure (*Münch. med. Woch.*, February 13, 1906) for making quantitative determinations of the fat in the feces. About 10 c.c. of the stool are placed in a wide-mouthed flask of about 300 c.c. capacity and a small piece of potassium hydrate and enough water to cause liquefaction are added. The flask is then warmed on the water bath, and after ten minutes about 100 c.c. of 96 per cent. alcohol are poured in and the heating is continued for twenty minutes longer. A funnel placed on the flask serves as condenser. The mixture is acidified with concentrated hydrochloric acid, using as indicator a few drops of a 1 per cent. alcoholic solution of alkali blue, and is filtered into a porcelain dish, the filter being washed with a little additional alcohol. The alcohol is then driven off on the water bath, which takes about an hour, and the residue is dissolved in as little ether as possible and is filtered into a special flask which is so made in two parts, the upper of these being a narrow graduated tube. The ether is evaporated by heat and enough hot water is poured into the flask to cause the fatty acids to float up into the graduated portion of the tube where the amount of fat may be directly read off from the scale.—*Medical Record.*

A REVIEW OF THE RECENT EFFORTS TO IMPROVE NEW YORK CITY'S MILK SUPPLY.*

BY LINSLEY R. WILLIAMS, A.M., M.D.,

Instructor in Medicine, Columbia University; Chief of Clinic, Department
of Medicine, Vanderbilt Clinic; Assistant Attending Physician,
City Hospital; Chairman of the Executive Committee
of the New York Milk Committee.

It is well known at the present time that there is a constant desire to remedy existing evils by means of legislation. It is not well known that the existing regulations of the State Department of Agriculture and of the City Department of Health are almost sufficient for safeguarding the city's milk supply.

In 1848 the Association for Improving the Condition of the Poor undertook a crusade to improve the city's milk supply. Popular lectures were given on the subject, and the Board of Health was stirred to renewed efforts to improve the supply. Since then there have been occasional efforts to improve the milk supply with beneficial results. A most valuable advance was made in 1905, when the Association for Improving the Condition of the Poor paid the salary of an extra inspector for the Department of Health, who, during a period of four months, made 2,900 visits, examined 3,550 specimens, took 264 samples, destroyed 6,739 quarts, caused 51 arrests to be made, and secured 47 convictions. The Association fully realized, however, that there was need of great improvement in methods of inspection and also of an increase in the number of inspectors.

During the month of June, 1905, the entire number of school inspectors were put on milk inspection for one week, which literally struck terror into the hearts of all the milk-dealers before the week was over. In the spring of 1906 the Association asked the Mayor to authorize the issue of special revenue bonds for the salaries of an increased number of inspectors; and as a result of this petition sixteen new inspectors were added for the city and fourteen (the first) for the country. This was a help, but literally only a step in the right direction.

* Read before the Monthly Medical Club, May 10, 1907; abbreviated and corrected to July 9, 1907.

During the latter '90's Mr. Nathan Straus, a retired merchant, undertook the problem of feeding sick children of the poor during the hot summer months. He furnished for the sick children of the poor modified and pasteurized milk in four different formulæ:—

	Fat.	Sugar.	Proteids.
Formula No. 1.....	3.75	6.	2.50
“ “ 2.....	a. 2.	7.	2.
	(with barley water and cane sugar)		
	b. 2.	7.	2.
	(with boiled water and milk sugar)		
“ “ 3.....	2.	6.	1.
“ “ 4.....	.75	5.	.50

Whole milk containing from $3\frac{1}{2}$ to 4 per cent. fat is also sold in 8 and 16 ounce bottles.

So far as can be ascertained, about 1,600 infants under two years of age are being fed by the modified and pasteurized milk from the Straus laboratories. There has been no accurate record of these cases published, but the investigations under the direction of Park and Holt proved fairly conclusively that this method of infant feeding produced much better results than when the milk was modified at the tenement home. It is a great loss that with such a large amount of material at hand the Straus laboratories have been unable to furnish any definite statement which would show that fewer babies died when fed in this way, compared with the other babies of the city, and that the proportion of deaths from contagious and infectious diseases was less.

During the fall of 1906 articles began to appear in the *Evening Mail*, exaggerating the dangers of the milk supply, and printing regularly the number of cases of contagious and infectious diseases and the mortality therefrom; not definitely stating so, but implying that all these diseases were due to impure milk. The articles appearing in the press apparently definitely proved to their author's satisfaction that pasteurization of the entire milk supply of the city would entirely eliminate all "milk born" diseases; that is, all contagious and infectious diseases.

Just about the time that these articles began to appear, a conference was held at the Academy of Medicine, under the auspices of the New York Association for Improving the Condition of the

Poor, on November 20, 1906, at which were present noted bacteriologists and pediatricians, veterinarians, chemists, dairymen, etc., and with the exception of Mr. Straus and his representative, Dr. Green, all were unanimously in favor of pure milk, which was only to be obtained by cleanly methods and adequate inspection, rather than pasteurized milk. As a result of this conference, the New York Milk Committee was formed, to try and carry out the ideas of this conference. Immediately after the committee had been organized, an ordinance was introduced into the Board of Aldermen to compel the milk-dealers to have all their milk pasteurized by the Department of Health, and for this purpose to pay two cents a quart to the Department of Health.

This ordinance was referred to the Committee on Public Health, of which Dr. Jacobson was chairman, and several public hearings were held. The ordinance was heartily approved by Mr. Straus and Dr. Green. After considerable opposition an amendment to the original resolution was introduced. This amendment proposed to allow certified milk to be sold as at present, certified by the County Medical Society Milk Commission, and that no milk be sold unless it contained less than 50,000 bacteria per cubic centimeter, and if this standard was not maintained the milk was to be pasteurized at the expense of the dealer. These hearings were of great interest and showed the large number of people interested in this movement. It was practically a fight between those favoring general pasteurization and those opposing general pasteurization. The defenders of pasteurization could not see why, if a physician was willing to feed a special baby upon pasteurized milk, he should not be willing to have all the milk always pasteurized.

The opponents of this bill were the County Medical Society of Kings, and its Milk Commission, the New York Milk Committee, the New York Association for Improving the Condition of the Poor, unofficial representatives from the Academy of Medicine, Bellevue and Allied Hospitals, County Medical Society and numerous other physicians from New York and Brooklyn.

As a result of the hearings another amendment was introduced, which changed the standard to 500,000 per cubic centimeter, and provided that every cow must be registered as free from tuberculosis before June 1, 1907, and that unless all the cows could be so registered the milk from said dairy must be pasteurized.

This amendment the committee referred to the Board of Aldermen, who, early in April, laid it on the table, and up to the present time nothing further has been done.

In February, a similar bill was introduced in the Assembly which proposed that no milk should be allowed to be put on sale in the City of Greater New York unless it had been pasteurized. This bill was referred to the Committee on Public Health in the Assembly, who amended it to allow the sale of certified milk in the City of New York under present regulations. This bill still lies buried in the Committee on Public Health, having been read once.

Pasteurization, that is, compulsory pasteurization, has faded a little from the public mind. It is undoubtedly unwise, unnecessary, and inexpedient that general compulsory pasteurization shall become the rule, and both the Assembly bill and the Board of Aldermen ordinance were bad specimens of proposed legislation, because both of them proposed measures which were almost impossible of being accomplished within the time proposed. As a result of this proposed legislation and newspaper agitation, the Mayor appointed a Commission of five, to investigate the milk situation and to report to him in full what measure should be adopted to improve the milk supply. The Commission appointed consisted of Drs. Joseph Bryant, T. Mitchell Prudden, L. Emmett Holt, A. Jacobi and Rowland G. Freeman; that is, our two best-known pediatricians, a well-known pathologist, who has for years been identified with questions of public health, and the most important expert on the bacteriology of milk. After some weeks' study and deliberation they handed their report to the Mayor. A summary of their report is as follows:—

“Realizing the magnitude and existing conditions of the milk problems in New York City, the Commission commends the system of the Department of Health, but finds its present facilities wholly inadequate; it believes that the danger of transmission of tuberculosis through milk has been greatly exaggerated and can be guarded against by the systematic inspection and condemnation of cows revealing tuberculosis on physical examination, which should be done by the State authorities; that protection against acute infectious diseases can be had through regulations of the Health Department and the education of the farmers, and by proper surveillance.”

The Commission then makes the following recommendations:—

1. That provision be made for 100 competent country inspectors, in addition to the fifteen now employed, including supervisors for fifteen districts, some of whom shall be veterinarians and physicians; and the establishment of a "standard of equipment and rules of action relating to the collection, care and handling of milk, for the use of those engaged in producing milk for sale in this city."

2. The employment of not less than twenty-five inspectors, in addition to the fifteen now employed, for inspection of milk in New York City. Also, five additional bacteriologists and five additional chemists, competent to judge properly and thoroughly as to the character of milk.

3. That dairies and milk shops shall be graded and rated by a system of score cards.

4. That cans and bottles shall be so labeled that it may be possible to trace to its source milk carrying infectious germs.

5. That the "sale of milk direct from cans" shall be permitted only under proper sanitary conditions, particularly keeping cans covered and iced.

6. That the sale of skimmed milk, which "has a high nutritive value," shall be permitted, but only in receptacles plainly labeled in large letters, "Skimmed Milk."

7. That infants' milk depots for preparing "properly modified and pasteurized milk for feeding babies" should be increased, as a means of materially reducing the high infant mortality.

8. That the Department of Health should seek by printed circulars and other teaching "to educate the people in the proper care and use of milk in the home."

9. That the Board of Health may require "efficient sterilization or pasteurization of all milk which it finds unsafe for consumption as raw milk," but that all milk so treated "shall be promptly cooled to at least 40° F., and be put into sterilized containers, under aseptic precautions, and marked with the time and date of pasteurization and the degree and duration of temperature."

As a result of this report the Mayor directed the Commissioner of Health to make application to the Board of Estimate and Apportionment for funds necessary to carry out these recommendations. The application was made and referred to the Comptroller,

and it is very likely that the appropriation* will be granted, so that the entire recommendation may be carried out.

During the past winter a joint Committee on Legislation—composed of four members of the Committee on the Prevention of Tuberculosis, and four members of the New York Milk Committee, consisting of Dr. A. Jacobi, Dr. E. G. Janeway, Dr. Alexander Lambert, and Mr. Paul Kennaday of the Charity Organization Society's Committee on the Prevention of Tuberculosis, and Dr. Rowland G. Freeman, Dr. Haven Emerson, and Mr. Stephen G. Williams, and Mr. John E. Sayles, of the Milk Committee of the Association for Improving the Condition of the Poor—have endeavored to secure amendments to the existing State Agricultural Law. Through their efforts three bills were introduced into the Legislature. The first bill was passed, which provided for the exclusion of any person suffering from infectious or contagious diseases, from engaging in the production or handling of milk. Those cases have been only voluntarily reported from month to month by the local Boards of Health. It is now made compulsory, and violation of the law is subject to the usual fine for violation of the State Agricultural Law. The second bill was passed, which condemns and rejects rusted and defective milk cans, and also requires the cleansing of cans and bottles before returning from the city to the country. Two inspectors may be employed by the State for the express purpose of inspecting these cans. The committee has also been able to have the appropriation for the State Department of Agriculture for this year increased to \$50,000. It has never been higher than \$25,000 any year previously. A bill has also been introduced which will enforce a quarantine on all cattle outside of the State for the condemnation and destruction of cattle with advanced tuberculosis, and for the isolation and quarantine of cattle that react to tuberculin, but in which there are no symptoms of advanced tuberculosis. This bill passed the Assembly, but was not passed by the Senate during the session just ended.

The Pure Milk League has recently been formed and has obtained an appropriation from the Board of Aldermen for the es-

*At a meeting of the Board of Estimate and Apportionment held July 8th the Comptroller made no recommendation, feeling that the number of inspectors asked for was sufficient and that the city could not afford it. Consequently no appropriation was made to increase the number of milk inspectors.

establishment of booths for the sale of pure milk in the parks, the milk to be supplied and sold by the League; the money has not been advanced, however, by the Board of Estimate. Under the auspices of the New York Milk Committee a series of lectures has been given, which has considerably stimulated public interest in the milk supply. The committee is also considering plans to establish a large number of infants' milk depots, to distribute at cost, to those who can pay, modified milk in nursing bottles, and to furnish it free to the destitute, and to urge, above all, the importance of breast feeding.

At a recent meeting of the Medical Milk Commission, held at Atlantic City, the National Association for the Prevention of Tuberculosis and many other organizations in the cause of pure milk were accused of being in alliance with the so-called "milk trust." Articles are still appearing in the daily press criticising the certified milk movement and the "milk trust," whatever that is, without any appreciation of the ideals for which those in favor of pure milk are striving.

The milk supply of Copenhagen, coming from one of the most famous dairy districts in the world, is not pasteurized, but adequately inspected, while that of Vienna is inadequately inspected, but very efficiently pasteurized. There is no way of gleanings from the experience of these two cities which is the proper method for New York to adopt. In this city efforts will continually be made to improve the purity of the supply, and efforts will continually be made in behalf of general compulsory pasteurization. The problem is not as easy as it seems, but with continued honest and well-guided effort, an absolutely safe milk supply does not seem too Utopian a dream.

Clabbered Milk for Sick Infants. — Reinach gives (*Jahrbuch für Kinderh.*, Vol. LIX., No. 4) the detailed histories of 44 out of 51 sick infants whom he has been feeding with "junket." The milk is artificially clabbered with lab ferment, according to von Dungern's directions. The clots are much finer than from ordinary milk. The results in the chronic cases scarcely surpassed those obtained with ordinary milk, but in acute gastrointestinal troubles the results were much better. Vomiting and restlessness after eating ceased after substitution of the clabbered milk in many of the cases, as also symptoms of irritation on the part of the central nervous system.—*Journal of the American Medical Association.*

RHEUMATIC CARDITIS IN CHILDREN.*

BY JOSEPH M. PATTON, M.D.,

Professor of Clinical Medicine, Medical Department of University of Illinois; Professor of Internal Medicine, Chicago Polyclinic;
Attending Physician Cook County Hospital,
Chicago.

The title of this paper was selected because of the prominence of two features of heart disease in children. First, the fact that the majority of cardiopathies in the young are of rheumatic origin; and second, that inflammations of the heart in children, where more than transitory, are seldom confined to either the covering, lining or mural tissues of that organ, but involve the one as well as the other. Therefore the term *Carditis* is appropriate in considering, somewhat generically, the inflammations of the heart in children.

As to the frequency of rheumatic heart lesions, they are acknowledged to be more common in children than in adults. Statistics vary greatly. According to West, 61.3 per cent. of the cases of rheumatism in children show endocarditis, while de Gassicourt gives the percentage as 81. In this connection we must remember that typical attacks of rheumatism are not common in children under ten years of age, and that they are rare before five.

The acquired forms of heart disease in children usually show definite causes; the majority are due to infection of which rheumatism takes first place. The upper respiratory tract is a frequent and important port of entry for infections which may result in heart inflammations, and these, as Packard has pointed out, may be other than rheumatic. Toxic muscular disease, primary as far as the heart is concerned, is rare except in connection with parenchymatous nephritis and certain acute infections, yet their occurrence must be admitted in connection with rheumatic infection. Diphtheria, tuberculosis, and influenza are not under consideration, though we may note that the latter is much more rare in children than in adults. Muscular degenerations of the heart and vessels are not present, hypertrophy is rapidly effected, and,

* Read before the Chicago Pediatric Society by invitation, January, 1907.

therefore, overstrain is a less serious danger than with the adult.

If we regard rheumatism as an infection, then rheumatic heart disease must be considered as due to the direct effect of the organisms of this infection and of their poisons upon the heart structures, endocardial, pericardial and myocardial. We may be ready, with Poynton and Payne, to regard the lesions as due to a specific bacterium, or we may regard the infection as of a somewhat protean nature. In either event, the long recognized features of heredity, predisposition, personal vitality and resistance, exposure to dampness and humidity, malassimilation, overcrowding in houses and in schools, gain instead of lose in importance.

Unquestionably, the most important factors in the etiology of heart disease in early life are local disturbances in the upper respiratory tract, and overcrowding of children in tenement dwellings and in public and private schools, especially in those where impure air and imperfect ventilation obtain.

The pathology of rheumatic carditis in children is rendered comparatively simple, for the various changes from the almost benign process showing swelling and exudation without destruction of tissue to the most virulent infection showing rapid multiplication of bacteria and the destructive tissue processes characteristic of the so-called malignant type of disease are readily explainable. The doubt at present is not as regards the infective nature of certain forms of endocarditis, but as to whether and to what extent mixed infection is necessary to such a process.

It is not necessary to discuss the character of the processes resulting in incompetence or stenosis of the valvular orifices; they are readily explained by infective causes. So far as endocarditis is concerned it is important to remember that simple endocardial inflammation is not only rarely, or never, fatal during its acute stage, but also that it is quite likely to pass unrecognized at this time, as the many instances of chronic endocarditis which have not had recognized acute stages testify.

Pericardial inflammation represents a more severe type of infection, as a rule; at least the acute phase is more often serious than is the case with endocarditis. Chronic, adhesive pericarditis may be difficult or impossible of recognition, as shown by a recent case of complete synechia of the walls of the sac, of which there was not one definite sign during life, the heart being immensely enlarged because of endocardial conditions.

Myocardial changes are, I believe, more frequent than we

have been accustomed to believe. In many cases the early appearance of dilatation can only be explained by assuming a damaged muscle, even though endocardial lesions be present. These muscle changes, by whatever name they may be called, are more marked in severe cases of pericarditis, yet they do not depend upon extension even though most pronounced in the vicinity of the visceral pericardium, for they may be found in patches distributed through the ventricular wall along the smaller blood vessels, and may be present even without pericarditis.

Poynton maintains that fatty changes are not entirely due to nutritional disturbances of the circulation, and can be produced in a few days in the monkey by intravenous inoculation of the diplococcus. The nature of these processes, the factors controlling their frequency and severity and the reasons why they vary so much in cases apparently of the same general character, are obscure matters at present, but they are of the utmost practical importance.

The clinical history of rheumatic carditis is an interesting study. As a profession we have been woefully neglectful of that class of manifestations which are premonitory to actual cardiac disease in children. In view of the extreme importance of preventative measures, these suggestive symptoms carry a double meaning.

Among these symptoms we have all the various ways in which insidious rheumatic tendencies may manifest themselves, such as imperfect nutrition, transitory fever, growing pains, epigastric pain, nervousness, night terrors, chorea, myalgia, arthritis, tonsillitis, epistaxis, slight lobular pneumonia, pleurisy, small glandular nodules, erythema multiforme, irregular bowels; these may all be forerunners of actual rheumatic heart disease.

Subjectively, children are apt to present obscure signs, pain and restlessness being relatively slight. Dyspnea, however, is more important in a child than in a grown person. But no one symptom is as important in a child as that same symptom would be in an adult, and we should hesitate to form an opinion on a single physical sign. Judgment based on moderate changes in the area of dullness, or on certain characters of bruits, is especially liable to be erroneous when the subject is a child.

In those instances where the heart is attacked early and severely, pain, dyspnea, nervous excitability, and the thumping impulse of the heart will call our attention at once to the fact of

cardiac involvement. But in many instances, I was going to say in the majority, our attention is drawn away from the heart by rheumatic manifestations elsewhere, or by some of the lesser, irregular manifestations of rheumatism, and the acute stage of the cardiac trouble passes by unnoticed. My personal observation has been that, of the patients from twenty to forty years of age who exhibit chronic endocarditis of undoubted rheumatic origin, the majority will deny any knowledge of the acute period of the disease, and generally of any rheumatic manifestation recognized by them as such. Herein lies the necessity for routine examination of the heart in children suffering from any condition suspicious of rheumatic possibilities.

Objectively, we are too much given to attributing increased pulse rate to fever, and, in the absence of any bruit or friction sounds, passing the heart as uninvolved. The heart muscle in children accommodates itself to pressure by dilating the chambers much more quickly than in the adult, even though its tissue be uninvolved, and it recovers from this condition with equal promptness. In this latter faculty rest the potential possibilities of the heart of youth in withstanding overstrain. Dilatation of the heart in children is, therefore, one of the earliest and most valuable signs of cardiac trouble, one which may be present without any other sign except a rapid pulse. But the pulse is a much more uncertain guide in children than in adults.

It is true that with dilatation there will be modification of the heart sounds, as a shorter, sharper first sound at the apex, and intensification of the second sound at the base, but these may not be so evident to some ears as would an increased area of cardiac dullness and a slightly displaced apex impulse as determined by careful palpation and percussion with the trunk in both the erect and recumbent positions, being careful that the body is neither turned nor inclined to either side.

While it is true that this condition of dilatation may occur from purely physical causes and cannot be regarded in itself as evidence of any form of carditis, it is, nevertheless, an early sign of the latter condition when such is present, and I believe it is not claiming too much to maintain that proper therapeutic measures at this time will often modify the course of rheumatic carditis and may prevent the development of organic changes which would be permanent.

It is not necessary to discuss the diagnostic features of valvular

lesions, but we should beware of expecting or depending upon classical features during the acute stage.

In mitral disease, the first sound becomes short and ill defined, and the murmur, if present, may be inconstant. A to and fro sound simulating aortic murmurs may be present in mitral lesions at first. A prediastolic or diastolic apical murmur during the acute stage is not always positive of stenosis in children. The second sound may, apparently, be reduplicated in mitral disease.

With aortic lesions, which are rare in children, the first indication of incompetence is a somewhat gradual weakening and disappearance of the second sound, which is then replaced by the characteristic murmur.

Acquired lesions of the right side are exceedingly rare, but I have observed an instance, elsewhere reported,* of slight pulmonary stenosis developing during an acute phase of chronic endopericarditis, and diagnosed during life by its characteristic murmur.

Pericarditis, while a most serious condition, is likely to cause errors in prognostic judgment because transitory attacks, even though marked by distinct friction, may be entirely recovered from, while a slow organizing type of inflammation without definite symptoms may lead to irreparable injury. Again, myocarditis and endocarditis may cause symptoms simulating pericarditis, while the latter may be absent.

In pericarditis the temperature is higher than with endocarditis, the pulse more rapid, excitable and possibly irregular. It varies much in rhythm and tension. The heart action is excitable and forcible. The first sound is short and sharp, and if there is friction and a bruit the combination is quite unlike any other. Precordial pain is often well marked. Friction may be single or double. It is best heard at the base or just above, or about the level of the third interspace or the fourth rib, between the left edge of the sternum and the left parasternal line. It is not always readily distinguished from endocardial sounds.

You are familiar with the physical signs of a considerable effusion into the pericardial sac, a condition not common in children with rheumatic carditis, yet more often met, I believe, than some authorities think. The diagnostic difficulty seems to be, and most of the errors I have observed have been, in distinguishing between cardiac dilatation and effusion. The area of dullness of

**The Clinical Review*, Vol. xxiii., No. 7, April, 1906.

the former may be, when considerable, difficult to distinguish from that of effusion. Ewart's sign, Rotch's sign, and the distinction between the limit of the lower left angle of dullness and the inner and higher position of the apex beat would be definite means of differentiation were it not for the fact that the two former may be present with a dilated heart, and the latter is usually difficult to determine. The shortening and weakening of the first sound in dilatation are often mistaken for the interference with the appreciation of the heart sounds by an effusion, while the diffuse character of the impulse of a dilated heart may resemble the lifting motion shown with effusion. I have several times been asked to aspirate a pericardial effusion, and found only a dilated organ. A rapidly disappearing effusion might, of course, account for this, but in some instances I was convinced that no effusion of moment had been present.

It is very difficult to separate the symptoms of myocardial changes from those of endo- or pericarditis. This is especially true of the most common type, in which the latter tissues are but slightly affected, and in which myocardial damage is not immediately severe. If, however, we can exclude pericarditis and any marked endocardial involvement, or it is evident that the degree of cardiac weakness is not explainable by the severity of the endocardial condition present, the symptoms must be attributed to changes in the myocardium. These patients show anemia, restlessness, dyspnea, even when at rest, rapid and irregular pulse, and a moderately dilated heart which remains large for a long time with marked variations in pulse rate and rhythm.

Another type of acute rheumatic myocardial disease, fortunately rare, because of its fatality and the danger of sudden death, is marked by a temperature around 101° , a pulse from 120 to 150, rapid breathing, precordial pain, pallor, syncope and vomiting. There is slight edema, a diffuse impulse, enlarged area of dullness in all directions, a short first sound, accentuated second sound, and there may be a systolic bruit very low pitched and difficult to hear.

The prophylaxis of rheumatic carditis in children grows in importance with our appreciation of the infectious nature of the disease. A better knowledge of the avenues of infection and of the laws which control its occurrence promises untold benefit to the youth of coming generations. In many instances our complete impotence to stay the development of incurable lesions of

the heart brings all the more forcibly to us the necessity of preventing the initial infection. We must, therefore, give closer attention to the conditions contributing to rheumatic infections. Most of these have been already enumerated. I wish, however, to lay special stress on two factors of importance. The first of these is the local condition of the upper respiratory tract, especially of the mucosa covering the turbinates, the state of the tonsils, and the adenoid conditions of the vault. Even in children who will not submit to operative measures when such are advisable, the daily use of a gargle and nose wash and prompt local attention to acute nose and throat infections will prevent much subsequent trouble.

The second factor of special importance is the opportunity for infection furnished by unsanitary dwellings and in overcrowded and imperfectly ventilated school houses. Mitigation of the former entails concerted endeavor by the forces of municipal sanitation and the philanthropic tendency of social economics, which it is not our province to discuss, but, in view of the amount of public monies expended on education and the direct interest therein of every citizen of family, it is evident that the municipal department of public health should exercise a direct supervision over the topography, architecture and conditions of attendance of our public schools with a view to limiting the opportunities for infection, instead of confining, as at present, their attention to the exclusion of suspicious subjects.

The general hygiene of childhood and the consideration which should be given systematic conditions likely to favor the occurrence of infections of any kind are matters the importance of which can only be alluded to here. Their management embodies measures with which you, as pediatricists, are more familiar than I, but while I do not wish to minimize the attention to be given to children of rheumatic parents, I would call attention to the fact that the infectious nature of rheumatism raises the physical condition as related to resistance to infection above the possibilities of hereditary predisposition, and, therefore, diet, fresh air and exercise assume an importance beside which the old beliefs of the dangers of meat diet, outdoor exposure and overstrain in such children are entitled to revision.

The treatment of acute rheumatic carditis embraces measures about which there is some divergence of opinion. The value of rest, however, is generally emphasized, and yet I believe this

measure is not sufficiently enforced. Holt is quite decided as to the value of prolonged rest, and I do not think he overstates it. It is always difficult to maintain rest with a child after pain and dyspnea have subsided, but it should be insisted on with the recumbent position until the heart does not increase more than four or five beats per minute with assuming the erect posture, whether the time necessary be three weeks or six. When the child begins to get about on its feet a rest of from one-half to one hour after meals should be insisted on.

When prolonged rest has been necessary the period between this and voluntary movements can be utilized with passive movements. Voluntary movements should be undertaken gradually and should be governed by much the same rules as in adults. The value of fresh air and change of scene should be kept in mind.

The medicinal treatment of the acute period of the attack brings up the question of salicylates. On the one hand we have the positive advocates of this drug as represented by Lees, who uses 10 grains of the sodium preparation every two hours during the day and every four hours at night, later, increasing to 30 or even 40 grains, if necessary. He controls its depressing action on the respiratory center, as represented by air-hunger, by giving twice as much bicarbonate of soda.

On the other hand are those who, like Poynton, believe that salicylates are only palliative and should be given in small doses. These, in cases of arthritis, will be from 5 to 10 grains every three hours. He does not believe it is antidotal in cardiac rheumatism.

Salicylates are, in my experience, effective. Both primary attacks and relapses usually respond to their use more or less promptly. In children from five to ten years old I seldom find it necessary to use more than from 5 to 8 grains every four hours, and I always combine it with an alkali, as sodium bicarbonate or the acetate of potash, or both, for the drug is then more quickly eliminated and its bad effects are lessened. It should be given in decreasing doses for a short time after active symptoms, especially fever, have subsided. I would also call attention to the value of salicylate of soda, both as a gargle and internally, in rheumatic sore throats in children.

After convalescence is established small doses of iodids are beneficial, iodid of sodium or strontium, or hydriodic acid preferred.

Strychnia is a remedy to be used with caution, and only for definite indications, such as a rapid, weak pulse, or for collapse after exertion. Children do not bear strychnia well, and their hearts are readily excited by it.

Digitalis, in the acute stage, should only be used if the heart is dilated and its exertion is out of proportion to the condition of the circulation. We must be careful not to mistake an excited heart for a weak one. The tincture is the most available preparation for children. It should not be discontinued abruptly.

Alcohol is useful in exhaustion or threatened collapse, but I have found very few occasions for its use.

When fever is high, the heart excited, and there is restlessness, from 5 to 10 grains of bromid of sodium with a quarter of a drop of tincture of aconite and a teaspoonful of sweet spirits of nitre every two hours will be found useful. If pain is severe codein and bromid of soda are beneficial.

The local use of the ice bag is efficient for two purposes: to quiet an excited, thumping heart, and to relieve pain, as in pericarditis. The ice should be fine, the bag should be arranged so as not to bear too heavily on the chest wall, and it should be removed if there is a sudden fall of temperature or any signs of collapse. Hot water bags should be placed near the lower extremities, if the limbs are cold, while the ice bag is in use.

Local or general bleeding is a measure only to be used under the exceptional circumstance of a dilated right side, and then with great caution.

Any measure which worries or excites the child is not worth continuing, and any avoidable disturbing influence should be carefully obviated.

There are many measures as to diet, general and symptomatic management, and after-care, for whose lack of consideration I excuse myself on the ground that in these the members of this society are more proficient than I.

A CASE OF IMPERFORATE ANUS IN WHICH THE
RECTUM COMMUNICATED WITH THE BLADDER:
ATRESIA ANI VESICALIS.*

BY CHARLES A. E. CODMAN, M.D.,

Physician to the Oncologic Hospital, Philadelphia.

AND

JOHN H. JOPSON, M.D.,

Surgeon to the Presbyterian and Children's Hospitals, Philadelphia.

The patient, a male infant, was born December 11, 1906, at 7 A.M., after a rapid normal delivery. The family history was as follows:—The mother has been pregnant thirteen times, with two miscarriages. There are nine children living; the oldest, a girl, was operated upon for a congenital angioma of the tip of the nose; another child, a boy, aged six years, has two undescended testicles. No other congenital malformations in the immediate family. The baby, weighing 9½ pounds, was cyanotic when delivered and breathed with difficulty. The color improved after the use of appropriate measures, but never became normal. About a half hour after birth it again became cyanotic, requiring artificial respiration and stimulation, which was repeated ten minutes later. The color was poor, the lips and eyelids remaining blue, and the bodily temperature was lowered. Examination showed no sign of anus, and no depression or dimple in the perineum, the surface from the scrotum to the coccyx being perfectly smooth. Three hours after birth it urinated twice at short intervals, and the first urine passed was dark brown in color, staining the diapers deeply and containing many shreds. The second time the urine was of a yellowish brown color and of a more liquid character.

On admission to the Presbyterian Hospital the same afternoon, the infant was again very cyanotic, improving later. Operation

* Read before the Philadelphia Pediatric Society, February 12, 1907.

the same day. Under light chloroform anesthesia a median incision was made in the perineum, posterior to the position of the bulb and extending over the usual site of the anus. It was carefully deepened, search being made for anything that felt like the lower end of a distended rectum. Finally this was thought to be felt in the median line, at the depth of an inch or an inch and a half, running antero-posteriorly. To one side of it the peritoneal cavity had been opened, in spite of great caution. An attempt was made to bring it down to the perineum and stitch it in this situation. It could not be approximated to the skin. The peritoneal cavity and surrounding structures were shut off as far as possible by suture. It was then incised, and a moderate quantity of yellow fluid evacuated. No meconium escaped. A grooved director was passed upward for a distance of three or four inches, but whether into bladder or bowel could not be determined with certainty. The opening was too small to admit the finger. Light packing was inserted, and the infant removed to bed, having borne the operation well.

During the night there was some oozing of blood from the wound, necessitating repacking. No meconium escaped. The child became somewhat blanched, and several times vomited a dark greenish fluid. The following day symptoms of obstruction being still present and the perineal operation having failed to relieve them, a left iliac colostomy was performed. The colon, greatly distended, was sutured to the edges of the abdominal incision, and opened at once. A very large amount of meconium was evacuated. The child at the time of the second operation was in poor condition, and died of exhaustion the same night.

Autopsy showed firm union already present at the colostomy site. The distended sigmoid had drained itself through the artificial anus. The lower portion of the gut tapered to a very small opening which communicated with a pouch opening into and forming a part of the base of the bladder, and this it was which had been incised at the first operation. The opening was between and below the ureters, to the left of the median line. The opening by which the rectum communicated with it was very small, barely admitting a grooved director, which explained why the instruments introduced at the time of the first operation never entered it, but passed upward into the bladder. Drainage of the gut through it had stopped soon after, if not before, birth. Only the little urine passed within three hours of birth was mixed with

meconium, and then but small quantities of the latter were apparently present. The fold of peritoneum enclosing the left ureter lay across and constricted, or helped to constrict, the terminal portion of the rectum where it communicated with the pouch at the base of the bladder, the gut being entirely intraperitoneal. The anatomical findings were very similar to those figured in Plate XII. of Bodenhamer's classical work, a case reported by Von Ammon, except that in our case there was no external depression marking the usual site of the anus, and the terminal portion of the gut was more tapering than in Von Ammon's case.

The malformations of the anus and rectum occur, according to the most exhaustive statistics, about once in 10,000 births. To a proper knowledge of their origin a study of the method of development of the intestinal canal and genito-urinary tract in the embryo is necessary. This method of development is so well understood that we will not go into details. Suffice it to say that in embryonic life the cloaca, which is developed in close apposition to the spinal column and is originally connected with the neuro-enteric canal, receives the secretions of both the urinary and intestinal tracts. These are divided about the eighth week of fetal life by the septum growing from the perineal spur. It is to the failure of complete division at this time that cases such as that we report owe their origin. To the same cause, in a modified form, are due the cases where the communication of the rectum is with the vagina or urethra. The anus is formed by an invagination of the epiblast or ectoderm. The septum between it and the rectum, which is developed from the hind gut, is finally absorbed. If this invagination does not take place, or if the septum between the two is not absorbed, one of the various types of imperforate anus or rectum results. This may or may not be associated with a communication between the rectum and the bladder, or some other viscus, such as the urethra or the vagina.

The classification of these abnormalities made many years ago by Bodenhamer is one of the most satisfactory. He divides them into nine subdivisions. It is to the sixth of these that the case under discussion belongs. To quote Bodenhamer: "The rectum in this species opens preternaturally into the bladder, the urethra or vagina; or into a cloaca in the perineum with the urethra and vagina. In these instances the normal anus does not generally exist." To this subdivision belong the largest number of cases. Thus, of 287 cases collected by Bodenhamer, 85 were included

under this head. Of this number, however, in only 25 was the opening into the bladder. Of the remainder, 26 opened into the urethra, and most of the others into the vagina. The latter, sometimes called atresia ani vaginalis, is the most common type of malformation of the rectum, and is not usually attended by intestinal obstruction or serious menace to life. We have seen at least 3 cases of this type in infants, and there are a number of cases on record in which these patients have lived to adult life without correction of the deformity, although such correction is, of course, indicated. When the rectum opens into the urethra or the bladder, however, the condition is a much more serious one, and especially is this true in the case of the bladder—atresia ani vesicalis. While obstruction may not be present in cases where the opening is a large one, and the meconium, and later, the feces, can be freely evacuated by urethra, ascending infection of the ureters and kidneys soon develops. If, on the other hand, the opening be a small one, as is very frequently, if not commonly the case, obstruction may more quickly develop. In any case prompt operative treatment is indicated. These cases of atresia ani vesicalis are nearly always in male infants, but a few cases have been observed in females.

Diagnosis.—Most of the malformations of this type are associated with imperforate anus. There may be no sign of an anus, as in our case, and, where an external opening exists, digital examination will usually show it to be imperforate. The escape of meconium from the urethral orifice may be associated with a vesical or urethral fistula. In the former case, however, the meconium is more apt to be intimately mixed with the urine, to which it imparts a greenish color, and it is only discharged during urination. The amount which escapes is of some value in estimating the size of the opening between the rectum and the bladder. When this is small, symptoms of obstruction will probably soon develop, or may be present when the case comes under observation. Restlessness, vomiting, and abdominal distention will then be observed.

Treatment.—The necessity for prompt operation in the type of malformation here reported is well recognized. It remains to refer briefly to the method of operation to be adopted. The following procedures may be enumerated:

(1) Perineal incision, cutting down on a staff introduced into

the bladder. This old operation (Martin's) has been practically abandoned.

(2) Attempts to reach the rectum behind the bladder and bring it down to the perineum. This was the procedure attempted first in our case. If this method is to be practiced as a routine measure it will probably have to be combined in many cases with resection of the coccyx or sacrum. The rectum is often situated very high in the pelvis, may be intra-peritoneal, and, instead of being dilated at the point of entrance into the bladder, is usually of a conical shape at its termination. For these reasons it may be difficult, or impossible, to reach it through a simple perineal dissection, or to bring it down after reaching it. If this method could be combined with a dissection of the bowel from the bladder and a closure of the fistula, it would constitute the ideal operation. Unfortunately the operative difficulties and the danger from shock and hemorrhage often make it impossible. A number of cases have been recorded where a perineal operation has been successful. In a number of others it has failed. In some, where the rectum has been reached and opened, the vesical fistula has subsequently closed spontaneously.

(3) Abdominal section, separation of rectum and bladder, and establishment of an anus in the normal site. Practically a combined operation, and theoretically adapted to cases where the gut is difficult of access by the previous method. Practically the danger from shock is equally great, if not even greater.

(4) Abdominal section, colostomy by Maydl's method, closure of the distal end of the colon at the site of colostomy, and the establishment of a permanent artificial anus. This precludes the possibility of further attempts to improve, and dooms the patient to an undesirable future.

(5) The formation of a temporary artificial anus. This may be practiced as a primary operation, or after failure of the perineal operation. Its disadvantages are that some of the feces will probably continue to leak into the lower gut and find their way into the bladder. Its advantages are that it can be quickly and safely performed, assures drainage and relief of obstruction, and does not prevent, and indeed favors, further attempts to establish an opening in the perineum. Through it exploration of the distal end will give valuable information as to the length and position of the gut, and will furnish a guide upon which plans for future operation can be made.

The choice of operation in imperforate anus and rectum will usually be between a perineal operation, and immediate colostomy with establishment of an artificial anus. Cases of successful operation by both these measures are not wanting. The mortality is not very different in either case, although colostomy has been oftenest practiced as a secondary operation, and in desperate cases with pronounced obstruction. Where obstructive symptoms are well marked, it should be preferred as a primary operation, as it can be more quickly carried out than the perineal operation and seems to us a very justifiable procedure in any case of this type of malformation. The perineal operation can be done later if the child survives. The second method of bringing down the rectum to the perineum is more nearly the ideal primary operation, but the operative difficulties often encountered may render it unsuccessful, even after excision of the coccyx, or resection of both coccyx and sacrum, and death may then ensue in spite of secondary colostomy.

Cerebral Palsies in Children.—W. J. Butler discusses (*Journal of the American Medical Association*, December 29, 1906) the etiology of the spastic cerebral paralyzes in children, and reports 3 cases. He comes to the conclusion that the causes are essentially the same as those that give rise to hemiplegia in later life, and can be stated briefly as follows:—First, vascular lesions, viz.: (a) hemorrhage from venous or arterial rupture, the result of trauma occurring spontaneously in intense congestions, as in convulsions, or the spasms of whooping-cough; (b) embolism from cardiac or arterial thrombi or endocarditis; (c) endarteritis and thrombosis. Second, inflammatory changes, to wit: acute encephalitis and meningoencephalitis. Third, rarely, a tumor. In children we lack the miliary aneurysms and arteriosclerosis of later life, but the intense congestions to which they are subject in convulsive diseases are enough to compensate. While the frequency of acute inflammatory processes as a cause may be in dispute, the fact that they may be occasionally causes seems established beyond a doubt.—*Medical Record*.

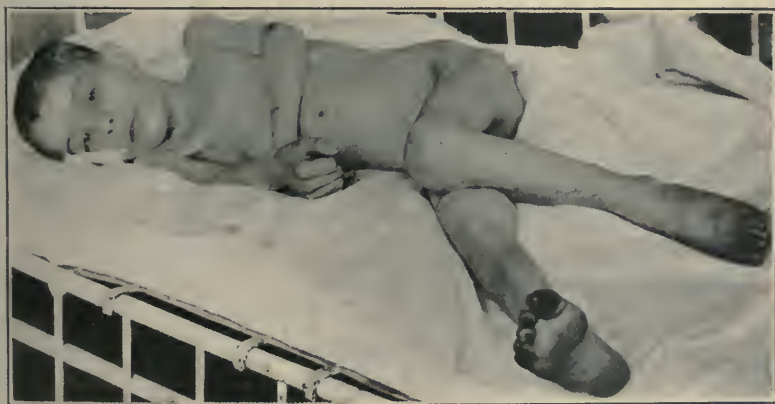
A CASE OF MULTIPLE ABSCESES AND SUPERFICIAL GANGRENE OF TOES, TREATED BY BACTERIAL INOCULATIONS.*

BY NATHANIEL GILDERSLEEVE, M.D.,
First Assistant in Bacteriology, University of Pennsylvania.

AND

HOWARD CHILDS CARPENTER, M.D.,
Assistant Pediatricist, Philadelphia General Hospital.

The patient, a white boy nine years old, was admitted to the Philadelphia Hospital, April 6, 1907. All that is known of his family history is that his father and mother are living and apparently well. Patient had measles when an infant, and scarlet fever when three years old.



PHOTOGRAPH SHOWING GANGRENE OF TOES AND SCAR ON
LEFT ELBOW.

The history of the present illness is rather vague. The boy had been kept in the house for about three months, because when out-of-doors he would eat dirt from the street. For two months before admission to the hospital the boy had numerous abscesses, at least six, on different parts of the body. Three weeks before admission, the toes on the right foot became swollen, and the flexor surfaces of all the toes, and the end of the little toe,

* Presented at the Meeting of the Philadelphia Pediatric Society, May 14, 1907.

turned black. He had no fever, but always complained of being tired; and since the first abscess steadily lost in weight.

The examination on admission was as follows: An extremely emaciated white boy; muscles and subcutaneous tissues are greatly atrophied. He has bed-sores on elbows and over trochanters. There is an abscess on the right side of the face, and another abscess at the base of the penis. He has scars and scabs remaining from multiple abscesses; two on the outer surface of the left forearm; one over the right patella, two on the left, one on the right buttock, and one above the trochanter of the left femur. He has scars on both elbows; one on the abdomen just above the umbilicus; two scars on the right side of the face; another in front of the right ear; and several on the scalp. The hair is thin, dry, poorly nourished, and grows down low on the forehead. The left pupil is slightly larger than the right; both react normally to light and accommodation. There is a catarrhal rhinitis, both sides of the nose containing moist crusts, and a suppurative otitis media with scanty discharge from the left ear. The teeth are irregular and unclean. The lower first molars on both sides are carious. The tongue is but slightly coated, the tonsils small, and the uvula is elongated. The cervical, axillary and inguinal glands are enlarged. The skin is mottled, especially on the extremities. The superficial veins are dilated over the upper third of the abdomen and lower half of the chest.

Heart.—The apex beat is in the fifth interspace, $\frac{1}{2}$ cm. within the nipple line. The cardiac dullness extends: above, from the third rib; to the left, as far as the midclavicular line; and on the right, to the left border of the sternum. There is a faint systolic murmur heard best at the apex, and not transmitted, probably hemic. There is a reduplication of the second pulmonary sound.

Lungs.—Restricted expansion on both sides, and breathing is chiefly abdominal. The examination of the lungs is negative, except for a slight increase of vocal fremitus beneath the right clavicle anteriorly, over which area there is slight impairment of resonance, increase of vocal resonance, and prolongation of expiration.

Abdomen.—The abdomen is moderately distended; the abdominal walls are held somewhat rigid; they are very thin, the subcutaneous tissue and abdominal muscles being atrophied. The

liver is enlarged, extending 5 cm. below the edge of the ribs in the midclavicular line. The spleen is not enlarged. Nothing else abnormal noted in the abdomen.

The boy has phimosis, the foreskin being considerably swollen. There is an abscess at the base of the penis.

On the right foot the tip of the little toe shows dry gangrene, with beginning line of demarcation. There is also superficial gangrene of the flexor surfaces of all the toes, especially of the large toe, the second and the fourth toes. An area of superficial gangrene is noted, over the metatarsal articulation, on the external surface of the foot.

On April 15th the boy developed a large abscess over the trochanter of the left femur. This was opened and discharged large quantities of pus.

The urine examination was as follows: Light yellow, very slight sediment, acid, specific gravity 1.018, no albumin, no sugar. Microscopical examination: a few leukocytes and amorphous urates. Another urine examination three days ago was practically the same.

On April 16th a blood culture was made—the culture was sterile. The blood count on the same day showed: 80 per cent. hemoglobin, 4,120,000 red cells, and 9,000 white corpuscles. A differential count on April 17th showed:—

Polymorphonuclears	42 per cent.
Small lymphocytes	47 “ “
Large mononuclears	9 “ “
Eosinophiles	2 “ “

On April 8th and 16th examinations of the blood were made for the Widal reaction, but both were negative.

Cultures were made on two different occasions from the abscesses. They all proved to be pure cultures of the micrococcus pyogenes aureus. Cultures were also made from the gangrenous toes with the same result.

On April 23d the patient's opsonic index was estimated, and found to be .6. Two days later we gave the boy an inoculation of an emulsion prepared from the pure culture of the micrococcus aureus obtained from the patient's abscess. The dose of this injection was 200,000,000 cocci. On April 27th and April 30th his opsonic index was .61. By May 3d, the patient's index hav-

ing come up to .8, he received, on May 6th, another inoculation of 200,000,000. On May 10th his index was .68, being in the negative phase.

The abscess on the hip ceased to discharge, and was entirely healed three days after the first injection; also the gangrenous areas on the toes began actively to separate.

Five days after the first injection the gangrenous tip of the little toe separated completely. The superficial gangrene of the remaining toes continued rapidly to be thrown off, and in ten days the toes were entirely healed.

At present his physical examination shows the patient has gained in weight since his admission to the hospital. He is now a well-nourished child, with abundant subcutaneous tissue. There is still a slight difference between the apices of his lungs. The abdomen is more prominent, and the liver is still enlarged. The superficial lymphatic glands are now not enlarged, except slightly in the left axilla and left groin. His skin is in good condition, and he has had no more abscesses anywhere on his body.

CONCLUSION.

This child, suffering from multiple abscesses and superficial gangrene, made a rapid recovery when treated with autogenous bacterial inoculations. We acknowledge, however, that the betterment of his hygienic surroundings materially assisted in his return to health.

Serum Therapy in Typhoid Fever in Young Children.—

M. Josias reported to the Paris Academy of Medicine (*La Tribune Médicale*, March 10th) that for four years antityphoid serum has been used in the Hôpital Bretonneau in the treatment of children suffering with typhoid fever. In the period previous, under the cold bath treatment, the mortality was from 10 to 12 per cent. Since the serum injections have been used with the baths, the mortality has fallen (in nearly 200 cases) to 3.3 per cent. In 1,031 cases treated in other hospitals, where serum therapy was not practiced, the mortality was 12.6 per cent. The reporter felt justified in claiming that the treatment was inoffensive, and that when applied early in conjunction with the baths, the chances for recovery are superior to those in cases treated by the baths alone.—*New York Medical Journal*.

Clinical Memoranda.

A CASE OF RHEUMATOID ARTHRITIS IN A CHILD OF SIX YEARS.

BY E. D. FENNER, M.D.,

Associate Professor of Diseases of Children, Medical Department of
Tulane University, New Orleans.

The patient, P. M. H., aged six years, presents a most advanced condition of rheumatoid arthritis. His parents are both strong and healthy, with no rheumatic trouble, but in the mother's family there has been at least one case of rheumatism. The patient is the oldest of three children, the others being a boy of four and a girl of two years. Both are perfectly well. There have been no miscarriages. This child was perfectly healthy until he was a year old, when he began to run about with some assistance. When a little more than a year old he had an enlarge-



ment of the left wrist, which was not, however, very painful. Soon after this his knees began enlarging. He had some pain (exhibited by crying) during this second summer. Throughout this second summer he was constantly sick with derangement of his bowels, and he lost entirely the power of walking. The di-

gestive disturbance obscured the symptoms, and diverted attention from the joint trouble. When he was twenty-five months old he finally took a step alone. Then he slowly began to learn to walk without help, but always very stiffly. The weather seemed to affect him, especially when it was damp, and then, as now, he found difficulty in walking in the early morning. During the past two months he has been able to move about better in the morning than he did formerly, but he often complains that he "is tired."



X-RAY OF KNEE JOINTS.

The photograph and X-ray print exhibit pretty clearly his condition. His gait is peculiar and striking. He walks with hips and knees somewhat flexed. The spinal column is rigid. In the neck there is no motion whatever. He can neither bend the neck nor rotate the head at all. All his joints are enlarged. The fingers show deposits about the phalangeal articulations resembling those of gout. The wrists are greatly enlarged. It appears plainly in the X-ray (taken in connection with the symptoms presented to the eye) that there has occurred an ankylosing inflammation between the vertebræ, and that similar deposits have occurred about the other joints. The spleen in this case is

not perceptibly enlarged, and the lymph nodes are not increased in size, although the mother says that they have been enlarged.

Such an extensive involvement of the articulations must be quite unusual in one so young. It is worthy of note that pain has been a minor symptom in this case. He has never suffered much from pain, and in recent months he has had even less. His mother says he has improved a good deal in the last few months, and it is a question whether this improvement will continue.

Appendicitis in Infants.—Kirmisson (*Revue de Chirurgie*, Vol. XXVI., No. 10) reports a case of acute appendicitis in an infant of eleven months. About sixty hours after the first symptoms the appendix was removed, but the child did not survive the day. Kirmisson has found 25 similar cases on record, 9 in infants under twelve months and 17 in the second year. Out of the total number, 19 of the children died and 7 recovered; all of the latter were over eighteen months of age. Appendectomy was done in 19 cases, with recovery in 7, and the deaths of 5 of the 12 children over a year old. The evolution of appendicitis in infants is exceptionally rapid and the prognosis grave. The only children who recovered were those operated on at once. In one case a pin was found in the appendix, in another soft material, and in 7 there were fecal or chalky concretions in the appendix. In the 12 cases in which the particulars are known, all were bottle babies except 3. Meat had never been given in any instance, which is an argument against meat as a factor in the etiology of appendicitis. Differentiation from ordinary gastroenteritis is difficult. Invagination was diagnosed in 4 or 5 of the cases and strangulated hernia in another. The child commences to scream, has one or two bilious vomitings, with fever, the abdomen tense and painful, and the pulse rapid, but the most striking symptom is the complete stoppage of stools and flatus. If it were not for the fever, invagination would be the first thought. The diagnosis was made only at the autopsy in the children under a year old, and it is possible that many children pass through an unrecognized appendicitis which proves mild and from which they recover. As the child screams constantly, it is difficult to determine any one point more painful than another. The onset may be gradual or sudden.—*Journal of the American Medical Association.*

INTUBATION IN WHOOPING-COUGH WITH SEVERE LARYNGOSPASMS, FOLLOWED BY GENERAL SPASMS.

BY W. L. JOHNSON, M.D.,
St. Louis, Missouri.

W. C., about eighteen months of age, had whooping-cough of marked severity. Beginning May 12, 1905, he began having severe laryngeal spasms. Since the 3d of May he had been having considerable rise of temperature, but no signs of a pneumonia or other infection (except, perhaps, a slight bowel infection) could be elicited.

Every general spasm seemed to grow more severe. Artificial respiration had to be performed several times to restore breathing.

In discussing the case casually, and with reference to intubation, Dr. Saunders reminded me that the French had used the tube in such instances, and advised trying it on the ground that the general spasm was very probably a sequence of the laryngospasm.

Midnight of the 14th I intubated. The boy never had another spasm. Sedatives were given, to be sure, but they had been given before. In three days I removed the tube. The boy recovered nicely, although his temperature kept up for some time. By the 24th my visits ceased. There never were any bad after effects from either the intubation or the convulsions, although the latter, for such frequently repeated convulsions, were the most severe I had ever seen.

That the general spasm depended upon the laryngospasm seems borne out by the fact that he never had another one after the laryngospasm ceased, with the placing of the tube in the larynx.

Cerebrospinal Meningitis.—Magakyane insists (*Roussky Vrach*, January 7, 1906) that the best method of treatment for epidemic meningitis is lumbar puncture, whereby the most distressing symptoms of the disease, such as pain, and stiffness of the joints of the neck and of the spine are relieved. The simultaneous presence of two different germs in cases of cerebrospinal meningitis suggests the confirmation of the thought of Dieulafoy that there is no cerebrospinal meningitis, but there are cerebrospinal meningitides.—*New York Medical Journal*.

ARCHIVES OF PEDIATRICS.

SEPTEMBER, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

ROYAL STORRS HAYNES, Ph.B., M.D.,

ASSOCIATE EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

President and Treasurer, E. B. Treat; Secretary, E. C. Treat.

Contributors and Correspondents, see page III.

DISTURBED SLEEP IN CHILDREN.

Healthy development rests upon the tripod of proper food, exercise and sleep, and of these the last is not the least important. Quiet sleep is not only an indication but is also a prerequisite of health. Causes of disturbed sleep in children are many, some easily, and others more difficultly, removed; they vary also according to the age of the child.

Normally, during the first year of life, the infant is occupied largely with sleeping and eating—during the early months sleeping from twenty-two to twenty hours out of the day. After the bath and after feeding, if the baby is made cosy and warm, it

falls to sleep at once, and wakes only because of hunger, thirst, cold or wet, or because of pain. As soon as the condition has been attended to, sleep is resumed. As the baby gets older and the special senses begin to unfold, the waking periods before and after the feeding times become longer, so that the baby lies happy and plays with its hands or with toys for an hour or so at a time, but two or three long day naps are requisite until the end of the first year, and considerably more than half of the twenty-four hours is spent in sleep. The night sleep should be for twelve hours, and uninterrupted save for one feeding; even this should be dispensed with at the end of the first year, for at times this night-feeding itself proves a cause of restlessness. During the second year twelve hours at night and one or two long naps by day are needed, and during the third year there should be one long nap in addition to the twelve hours' sleep at night. It is desirable to continue the daily nap as long as possible, preferably after the midday feeding; but with some children over three years, who sleep hard at night for twelve to fourteen hours, sleeping by day is impossible, and perhaps even unnecessary. They should, however, lie down and have a rest at midday.

Children that go to school, even kindergarten, require somewhat more sleep than those who have no set mental exercise, and should be made to go to bed very early. From four until seven years the night sleep should be eleven or twelve hours, and even at fourteen years ten hours are required. Since children awaken at about six o'clock in summer and seven o'clock in winter, the hour for being in bed and asleep should be arranged so that liberal allowance of time is left for the requisite number of hours' sleep. College students need, most of them—though they seldom take it—nine hours of sleep at night. They should be encouraged to take the full quota, not only by going to bed earlier, but also, as has recently been proposed, by a different arrangement of the time of morning recitations for summer and winter; such that recitations begin later in the morning in winter and earlier in summer.

Probably the most frequent single cause of disturbed sleep is intestinal or gastrointestinal indigestion. Because of their restless sleep, accompanied, perhaps, by night cries and teeth-grinding, children are often thought to have "worms," when the trouble is simply abdominal discomfort and pain due to faulty diet, an unnecessary night-feeding or a supper eaten too rapidly or in too great amount. Next in frequency as causes are those producing other sorts of discomfort—either pain, itching or dyspnea. Ear-ache, the headache of any fever, eczema, excessive perspiration due to too heavy night clothing or bed-clothes, a close room—each may bring about poor sleep. Any respiratory difficulty quickly causes restless sleep and the commonest factor for such dyspnea is adenoid vegetations. In young infants, a simple rhinitis may prevent sleep for several nights. Children suffering from dyspnea, particularly those with adenoids, are apt, besides snoring when lying on the back, to throw off the bed-clothes, and to take a knee-chest position with the head bored into the pillow. The dyspnea is increased by, but may be entirely due to, a warm or poorly ventilated room.

Mental excitement or strain prevents the nervous system from quieting down into natural sleep. A romp at night, or new toys just before going to bed are factors in infants. Children's parties, a day at the circus or the first day at school or in a new place, or a long journey may bring about enough excitement to keep the child awake.

A neurotic inheritance with the unavoidable neurotic environment entailing lack of discipline and irregularity as regards diet, hours of meals, mode of life and nerve control may be a strong predisposing element in disturbed sleep. Night terrors are usually due to indigestion or recent nervous excitement or strain. Functional and organic nervous diseases may, of course, be accompanied by disturbed sleep. In infants, rachitis and congenital syphilis are important causes to be treated. In any case it is of prime importance to make a minute study of the child's diet, and mode of life, including the school work and kind of

play, as well as to make a careful physical examination for any defects in the special senses and in the nutritive functions. In addition to removing any causative factor, it is important in all cases to supervise the diet, to arrange regular hours for eating, and to regulate the amount of exercise and study. For infants, regular training to set hours for sleep will often work wonders—the baby being simply put down and left to go to sleep by itself at the hour determined upon. A cool, quiet, dark room will usually result in peaceful slumber, unless there is wrong management or some abnormality. If there is pavor nocturnus and the child awakes screaming in terror of an imaginary something in the room, it is best to leave a small light in the room for a few nights. A warm bath at night acts as a sedative and is useful with children of neurotic inheritance, in addition to the measures mentioned. Rarely, in the purely nervous cases, it may be advisable to use bromids for a night or two until the habit of wakefulness is broken; but, in general, these cases are to be treated by general measures rather than by drugs.

Disease of the Aorta in Congenital Syphilis.—Bruhns made serial sections (*Berlin. Klin. Woch.*, March 5, 1906) of the entire length of the aortas of nine congenitally syphilitic children. Eight of these were stillborn or died shortly after birth, and one had lived to the age of three months. The vessels showed no gross lesions, but pronounced changes were discovered in the microscopical preparations in 6 of the cases. The author concludes that in congenital syphilis areas of inflammation occur, situated in the outer layers of the media and in the adventitia, especially in the neighborhood of the vasa vasorum. These inflammatory foci correspond closely to those described by Chiari in acquired syphilis as productive mesaortitis. The discovery of these changes in congenital syphilis, therefore, indicates that productive mesaortitis is to be regarded as a manifestation of syphilitic disease in the aorta.—*Medical Record*.

Bibliography.

Handbuch der Kinderheilkunde, a work for the practicing physician, edited by **Prof. Dr. M. Pfaundler**, of Munich, and **Prof. Dr. A. Schlossmann**, of Düsseldorf, with the collaboration of forty-five well-known specialists of Germany, Austria and Switzerland. Two large octavo volumes of 1,000 pages each, profusely illustrated with 61 colored plates and 430 figures in the text. Price per volume, unbound, 30 marks. Leipzig: F. C. W. Vogel, 1906.

Pfaundler and Schlossmann's *Handbuch der Kinderheilkunde* is a most ambitious effort. It is in two parts, consisting really of four volumes, containing altogether about two thousand pages. The list of authors numbers forty-seven, and includes the names of many of the younger workers active in pediatrics in Germany and Austria at the present time. The work from the standpoint of the bookmaker's art is unusual in its excellence. The illustrations are profuse, many of them in colors, copied from wax models, and are surprisingly true to nature.

The first half of Volume I. treats of general subjects—pathology, symptomatology, prophylaxis, therapy, morbidity, mortality, nutrition and metabolism. These subjects are all treated interestingly. The article on prophylaxis recites the methods pursued abroad in this vital field of pediatrics, and while it contains nothing particularly new it is amazing to note how many important prophylactic measures are entirely overlooked, or only rarely practiced by us. The custom of washing out the mouth of the nursling before feeding has been entirely abandoned, and is severely deprecated.

The chapter on symptomatology is valuable in that symptoms are considered in relation to all the conditions in which they may occur. This has not been done so thoroughly in any previous work, and should prove especially helpful for reference.

In the chapter on nutrition the question of cow's milk is considered, but the method of production and handling does not compare favorably with ours. The question of breast feeding is ably discussed and much that is valuable may be gleaned from it. Stress is laid upon the statement that milk is produced by the specific action of the mammary gland and not, as formerly taught, by the breaking down of the cells in the gland.

The chapter on metabolism is well written, and covers the ground fully, although lacking somewhat in details.

The second half of Volume I. takes up the diseases peculiar to the various periods of childhood, including sclerema and sclerodema; general diseases, such as those of the blood and blood-forming organs, hemorrhagic diseases; scurvy, rickets, diabetes, scrofula and the infectious diseases, including syphilis and tuberculosis. The treatment of scarlet fever by Moser's serum is discussed. The conclusion arrived at is that, in severe cases, used early in doses of 200 c.c., it is of undoubted value.

The subject of diphtheria is exceedingly well handled. The dose of antitoxin, however, is less than we are accustomed to use—1,000 units for ordinary cases; for laryngeal and grave cases 3,000 units, to be repeated if insufficient. The chapter on syphilis is the best discussion of the subject we have seen.

The first half of Volume II. treats of diseases of the digestive system, including the pathology of metabolism, intestinal flora, and poisons (intoxications); the respiratory system, including diseases of the thymus gland, and the circulatory system, including the diseases of the thyroid gland.

The second half of Volume II. comprises the diseases of the genitourinary system, the nervous system, and of the skin.

The article on the genitourinary system is extremely good; in fact, one of the best in the work.

The short article of Phister's, concerning the central nervous system, as it is peculiar to childhood, is concise and satisfactory.

The handbook has been written for the practicing physician, but this idea has not always been kept in mind, and articles which are otherwise excellent lack in that detail which is necessary in such a work.

As in any work which is the effort of many authors, there are numerous contradictions, repetitions and inequalities. An English translation of the work is in preparation.

But taken as a whole it is an excellent work, with illustrations better than we have ever seen. The work is of great value in that it gives us a complete picture of continental pediatrics at the present time.

Society Reports.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, January 15, 1907.

J. W. VANDERSLICE, M.D., PRESIDENT.

DR. W. J. BUTLER gave the results of his

STUDY OF THE AREA AND AUSCULTATION FINDINGS OF THE HEART IN LATE CHILDHOOD.

For this investigation he had selected 100 children, ranging in age from six to fourteen years, who were entirely free from any cardiac, vascular, renal or blood disease. Abdominal distention from any cause was absent in all cases. Both the erect and recumbent postures were used in these tests.

His conclusions as to area were: The upper border was most frequently found on the third rib in the parasternal line; the right border may extend from $\frac{1}{2}$ to 2 cm. to the right of the sternum, while the apex was most often in the fifth space inside the nipple line.

Among these children murmurs were found in 64, but in only 18 were they heard in the erect position. All were systolic and were extracardial, the so-called accidental murmurs. He had also tested the blood pressure by the Riva-Rocci apparatus and found the average to be 119. In no instance was it below 100.

DR. A. C. COTTON opened the discussion of Dr. Butler's paper by expressing some surprise that but slightly more than 50 per cent. of the children examined showed a shifting of the apex beat or the dullness of the right border on changing from a horizontal to an upright position.

He said that a number of years ago he had made some observations on hearts in school children from a public school across the street from Professor Knox's Clinic. It was his duty to prepare the children for presentation, and not infrequently he was chagrined and annoyed to find that when Professor Knox pre-

sented the case to the class he did not agree with Dr. Cotton's indication of cardiac dullness. At first, he thought he might be mistaken, but the disagreement occurred in a number of instances in which he was quite sure he was right. This led to a friendly private discussion between Professor Knox and himself, and it was discovered that the Professor had examined the children in a standing position before the clinic, while in Dr. Cotton's examinations they were in a recumbent position. He stated that while he had kept no accurate record of the number, his impression was that a much larger percentage than Dr. Butler reported showed the variation in a changed position. He thought the condition of the stomach as to repletion or emptiness would influence this variation, and considered the question of the mobility of the heart one of much interest in its relation to gastric, abdominal and pulmonic conditions.

In reference to the recumbent position, he thought the use of a pillow, or the fact of the child's head being on a level with the scapula, made considerable difference. With the sternomastoid muscles relaxed considerable difference in the plastic thorax of the child would be noted in regard to the anteroposterior diameter of the thorax, and this would make some difference in regard to the cardiac area and the question of embarrassment of freedom of heart action.

DR. JOSEPH M. PATTON said he appreciated the value of Dr. Butler's observations demonstrating the relation of the heart wall to the chest. The mere fact that the heart changes position is of no particular value as a statement unless the measurements of the chest are given, the approximate degree of expansion of the chest taken into consideration, the absence or presence of intra-abdominal distention and the excursion of the diaphragm noted, all of which have a great deal to do with the position and the area of the heart. These facts, as they have been given by Dr. Butler, have a great deal of interest in connection with the figures he has given in relation to the exact position of this or that border or apex beat. The heart in children is undoubtedly much more mobile than it is in the adult. The idea obtained from our plates in books is that the heart is in a perpendicular position; it is sometimes forgotten that the heart is in an almost horizontal position naturally, and especially so in children, and with the flexible condition of the cartilages of the chest the difference in the ex-

cursion of the base and apex in the child is much greater than in the adult; and, therefore, the position of the right border especially is liable to a good deal of change.

The variation in his figures, and in the figures of others, shows that too definite ideas cannot be based on a comparatively small variation in the position of this border or that border in the child, a principle which is true in regard to all of the clinical signs of heart disease in children. If there is any one direction in which one is liable to err in estimating the signs of heart disease in children, it is that all are inclined to place too much stress on the definiteness of one particular symptom.

In regard to the murmurs, Dr. Patton said he did not think it was possible to lay down theoretical rules which are as definite as those which pertain to adults in regard to murmurs and the distinctions which exist between extra- and intra-cardiac murmurs. It is more difficult in the child to say whether a certain murmur is extracardiac or cardiopulmonary than it is in an adult, because of the difficulty in making a child breathe just as one would wish or to suspend respiration for any certain length of time.

Dr. Patton thought the points of practical interest are that accidental murmurs in children are practically always systolic, and that while the extracardiac murmurs are, perhaps, more often heard in the region of the apex they are not always confined to the apex, and that they have no definite direction of transmission. Those points are practically all as stated and are of definite value in diagnoses.

DR. BUTLER, in closing the discussion, said, concerning the murmurs, that his observation of those children would not agree with Dr. Patton's statement of their being most frequently found over the apex. They were found in quite a number over the apex, but on figuring all up he found them most frequently over the pulmonic area. Of course, a great many cases combined both areas. The point mentioned by Dr. Cotton that heart areas vary decidedly in children in the recumbent and upright positions is certainly correct. The relative dullness may vary considerably to the right, it may vary all the way from the left border of the sternum to 2 cm. to the right of the sternum and still be within absolutely normal limits. It must be remembered this relative dullness is very slight and will be found satisfactorily only by

light percussion. Another point to which Dr. Butler called attention was that heart lesions do not exist in many cases where the diagnosis is made simply on the basis of a murmur. A systolic murmur in a child not reinforced by other evidence of cardiac disease is of little value. It was his opinion that this applies not only to children, but that it is also true in adults in whom accidental murmurs are not altogether infrequent.

DR. JOSEPH M. PATTON read a paper entitled:—

RHEUMATIC CARDITIS IN CHILDREN,

which is published in full on page 693.

DR. J. W. VANDERSLICE opened the discussion of Dr. Patton's paper by referring to the treatment of rheumatism indorsed by Dr. Lees. He gives large doses of salicylates protected by double the quantity of bicarbonate of soda in all cases of chorea, as well as in all cases of rheumatism. He says there is no contraindication for its use during an acute or chronic endocarditis. He has given these very large doses in acute endocarditis in a large number of cases for several years and, so far as he can see, without detrimental effect. Dr. Poynton, along the line of the treatment of chorea, says, in regard to Dr. Lees's treatment, that chorea is a self-limited disease—it comes and goes—and he believes it is contraindicated to give a drug that may do harm, although from his experience he could not criticise the treatment as laid down by his senior.

The use of the leech is strongly advocated by both Dr. Lees and Dr. Cheadle, and in their hands certainly was successful and proved the most valuable adjunct to their practice in later years. Apparently the benefit did not depend upon the quantity of blood withdrawn, for even a small amount seemed to relieve the strain on the right heart. They were certainly both of them very enthusiastic in the use of the leech where the right heart was dilated one finger's breadth to the right of the sternum.

Dr. VanDerslice said it was always a question in his mind whether strychnia and digitalis were indicated in acute endocarditis. He had considered rest and bromids far better than a stimulant. It had been his experience that strychnia was well borne by children.

DR. J. C. COOK said he thought everyone who had attempted

to make a differential diagnosis clinically in these cases has been uncertain, in his own mind, whether his reasoning was convincing to the man he was trying to convince or not.

In regard to the treatment, Drs. VanDerslice and Patton referred to the use of strychnia and digitalis in the acute stage of this disease. He was surprised that strychnia had ever been considered standard treatment in the early stages of these cases, and so far as his personal experience goes he thinks the ice bag is worth everything else in the first forty-eight hours.

DR. A. C. COTTON said he presumed that, even after listening to so comprehensive a presentation of the subject as Dr. Patton had given, notwithstanding all they may have read and studied, most practitioners would fall back upon their own experience for safety. He was pleased to find such a diversity of opinion in regard to the frequency of pericardial effusion. He considered it extremely difficult in children to make a diagnosis of a moderate effusion.

In regard to the treatment of acute carditis, Dr. Cotton wished they might all feel settled and regarded the radical difference of opinion existing on some points as proof that no very safe ground has been reached in therapy. All agree on rest and the use of ice; perhaps all would not agree with him in his use of bromids, which he is in the habit of giving in syrup of lactucarium. All agree that the feeding is essential, the food being of such a character, preferably liquid, as will avoid all distention of the abdominal viscera. Too much flooding of the system with water is not a desirable thing, because it increases the burden of the heart by increasing the volume of circulatory fluids.

In regard to the salicylates, strychnia and digitalis, repeated attempts to use them had been unsuccessful, because of resultant gastric disturbances. He would not hesitate to use codein or other form of opium in cases which did not yield to the bromids.

Dr. Cotton said he was quite a firm believer in the use of the leech to relieve a crowded, overloaded right heart. He regarded the fact of disagreement in regard to treatment as evidence that in the severe cases of carditis practitioners have to deal with one of the most formidable conditions in the child.

DR. PATTON closed the discussion by saying that the treatment outlined in his paper was not applied to any definite phase

of the disease, but was merely generalization, and that in the acute stage he would say strychnia should not be used because it excites the heart; neither would he use digitalis, because the one reason for using digitalis is dilatation. If there is no dilatation, why use digitalis? If strychnia is indicated he would use it whether the patient be a baby of six months or an adult, but he would be very sure of the indications.

In regard to the use of salicylates, he said pure acid would relieve the swelling and pain of arthritis in twenty-four hours if enough were given. If salicylates will relieve the local conditions in arthritis, why may we not expect something more than an analgesic action in carditis? At any rate the therapeutic nihilists offer no efficient substitute, and his experience has been that in most cases of acute rheumatic endocarditis the patient will respond directly to the use of the salicylate of soda.

Pulmonary Tuberculosis in School Children.—Roeder says (*Berlin. Klin. Woch.*, March 26, 1906) that a true idea of the prevalence of this disease in children cannot be gained from hospital statistics, inasmuch as it has been found that a very large proportion of children so afflicted do not complain of illness until the disease has reached an advanced stage. Therefore it is necessary to make thorough physical examinations of all school children at regular intervals. Statistics of this sort recently obtained in Prussia show that tuberculosis is by far the most dangerous enemy of children during the ages from five to fifteen years. Roeder recommends, for the purpose of combating this tendency, regular examinations of all school children, and instruction concerning the dangers of the disease. All children found affected should be sent to suitable convalescent homes or sanatoria, which must be provided in sufficient numbers. After an adequate period of treatment in these, the children should be transferred to settlements and schools situated in the country. Tuberculous children and those with a predisposition to the disease should be watched until the school course is finished, at which time all children should be examined and be provided with a certificate stating their condition of health.—*Medical Record*.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, February 14, 1907.

GODFREY R. PISEK, M.D., CHAIRMAN.

A CASE OF COMPLETE ALOPECIA AREATA.

DR. HENRY E. HALE presented this case, a girl 14 years old. When she was 10 years and 8 months old, a completely bald spot appeared on the top of her head in the course of a few days. This extended so rapidly that in three months the hair had disappeared from the entire scalp, and in four, even the eyebrows and eyelashes were gone. These, however, grew and fell out several times in the course of the following summer. Three months ago, three years after the onset of the baldness, her hair began to return in patches, at first light in color and fuzzy, gradually becoming black and normal in texture. Even now, most of the scalp is bare, and in no place is the hair more than an inch long.

Some dermatologists hold alopecia areata to be a tropho-neurosis, while others believe it parasitic. Some cases are supposed to be due to congenital lues coming on after the age of 18 or 20; these are the most hopeless cases, and with the baldness is often associated falling off of the nails. Alopecia areata occurs with pulmonary tuberculosis, the hair returning after the pulmonary lesion has been healed. The epidemics which have been reported have probably been due to ringworm of the scalp.

The prognosis is better in the younger children.

The treatment consists of stimulation with drugs, such as chrysarobin, or by the use of either galvanic or static electricity. Dr. G. T. Jackson has had a case in which he stimulated one side of the head and not the other, obtaining a growth of hair only on the side treated.

DR. HENRY W. FRAUENTHAL believed that congenital syphilis was a factor in this case.

A CASE OF LITTLE'S DISEASE.

DR. WALTER B. JENNINGS presented a boy of six years, well developed and bright, with no stigmata of degeneration except a high arched palate, who could not speak distinctly owing to an involvement of the muscles of the throat, and who, in walking,

was obliged to cross one leg in front of the other with the characteristic "cross-legged progression." His arms and legs were somewhat rigid, and the tendon reflexes were exaggerated.

He was born after a difficult labor of twenty-four hours, but seemed like other children until he was 12 to 18 months old. When 18 months of age he fell over, helpless, and became unable to walk. At one time he was treated for rickets, and at the age of 4 years had spinal meningitis.

DR. JOHN HOWLAND believed this to be a very marked case of meningeal hemorrhage occurring at birth. The child had breathed badly after birth, and artificial respiration was necessary. He could not hold up his head when 8 months old, and at 18 months could not sit up without assistance. Dr. Howland thought the prognosis absolutely bad as regards regaining power in the legs, but that the mental condition would probably always be good.

DR. LA FÉTRA said that he saw the patient at the Roosevelt Hospital when the child had meningitis, and that the spasticity and increased reflexes which were then present had not been regarded as existing from birth, because his attention was directed more to the meningitis than to the previous history.

DR. GODFREY R. PISEK said that Little's disease could be ruled out here. The congenital history, the spasticity and rigidity of that disease were not apparent in this case. There was no doubt in his mind that the condition was due to a hemorrhage into the brain at the time of birth.

A CASE OF MULTIPLE BONE TUMORS (EXOSTOSES).

DR. HENRY W. FRAUENTHAL presented this patient: a young girl who had a number of bone tumors, mostly affecting the flat and long bones, but not the bones of the skull.

DR. SAMUEL LLOYD reported the case of a child about four years old, who, having fallen forward and landed on both hands, had what seemed to be tuberculous dactylitis, starting in the metacarpal bones of the little fingers. It was presented as such to the Orthopedic Section, but in a few weeks the olecranon was involved, and shortly after tumors appeared in various parts of the body, until there were at least half a dozen exostoses. Finally the child died of sarcomatosis, with the characteristic egg-shell-crackling in most of the tumors.

A CASE OF MYCOTIC CARDITIS WITH MULTIPLE EMBOLI AND EXTENSIVE GANGRENE OF THE LOWER EXTREMITIES.

DR. E. K. GOLDSTONE reported a case of a child two and a half years old who had two attacks of pneumonia and one of diphtheria, the last one month before he was seen, who developed thrombi in both femoral arteries with ecchymosis, swelling and gangrene of both legs and thighs and of the penis and scrotum. At first the heart appeared normal; later the action became irregular and a faint systolic murmur was heard at the apex. Just before death, which took place in coma, following extreme dyspnea, there were petechial spots on both cheeks and the eyelids. The urine showed albumin and blood casts, and there was some suppression. There was no autopsy nor bacteriological examinations.

Dr. Goldstone was of the opinion that the cardiac condition dated from the diphtheria a month before.

DR. CHARLES HERRMAN presented four patients, illustrating the subject of his paper, which was upon the following topic:—

PIGMENTED SPOTS IN THE SACRAL REGION OF WHITE AND NEGRO INFANTS.

These spots are grayish blue (white) or greenish gray (negro) irregular spots which appear usually in the sacral, lumbar and gluteal regions, occasionally on the upper part of the back, the shoulders or the extensor surfaces of the upper extremities, and very rarely on the face or thigh. They occurred in 20 per cent. of the negroes examined by Dr. Herrman, and about once in every 400 white children. They are present at birth, become more distinct during the first two or three weeks and gradually disappear by the end of the second year, exceptionally remaining for a longer time. In white infants there is commonly a single spot, while in negroes there are several. They are irregular in outline and vary in size from that of a dime to the size of the palm of the hand. There is no growth of hair on the surface, and no indication of blood vessels. These spots are due to pigment cells in the deeper layers of the skin, and similar cells can be found in about 40 per cent. of white infants, though spots are visible only 1 in 400. Their wide distribution and the frequent appearance of the characteristic cells where there are no spots to be seen speak against their being a racial characteristic.

DR. HERMAN SCHWARZ asked if the children showed any Mon-

golian characteristics, and if in Mongolian idiocy such spots were seen.

DR. CHARLES HERRMAN, in reply to Dr. Schwarz, said that he had never seen the spots in Mongolian imbeciles, and that the infants who presented these spots showed no signs of imbecility.

DR. GODFREY R. PISEK said that as, in the cases presented, the individual color depended upon the complexion or color of the infant, so in the negro, where the scrotum and perineum were dark, the spots were darker.

THE SURGICAL TREATMENT OF EMPYEMA.

DR. SAMUEL LLOYD read this paper. He said that at present there was but one treatment for empyema: the immediate evacuation of the pus by some surgical procedure. Neglect of available diagnostic aids was often the cause for such cases not being recognized and treated sooner. Often too small aspirating needles were used to establish the diagnosis. Some aspirated fluids seemed to be serous which microscopically contained many bacteria, and these cases should be regarded as cases of empyema. If such was demonstrated of any aspirated fluid, all of the fluid should be withdrawn at the time of exploration. If the lung was free and expanding, this might suffice, but if the lung did not expand, thoracotomy should be performed. Resection of a rib should be done when there was not enough space between the ribs for the insertion of a drainage tube without compression, when the adhesions were too dense to allow of expansion of the lung, and when the micro-organisms were of a virulent type. Decortication has a comparatively small application, the problem of obliterating the suppurating cavity being best solved by the expansion of the lung. In operating, the anesthetic should be ether, which should be discontinued after the rib is resected, so that the pleura may regain its sensitiveness. This is to be desired in order that coughing may expand the lung when the pleura is irritated. A detailed account of Dr. Lloyd's technique may be found in the *Annals of Surgery*.

DR. L. E. LA FÉTRA said that if there were high fever, it was better to wait two or three days after the empyema had been made out before operating, for the children did better if operated upon when the temperature was down.

A small number of cases could be cured by simple aspiration, as was shown by a boy who had been presented before the section

two years ago, of whom it was predicted that he would die of tuberculosis or of reaccumulation of the fluid, but who is now perfectly well. Dr. Lloyd's idea of causing the expanding lung to fill up the cavity was extremely interesting.

DR. HERMAN SCHWARZ agreed that one should not operate for empyema as soon as the case was diagnosticated. He had himself followed Dr. Lloyd's method of giving the anesthetic. Resection often caused too much shock, and, if necessary, it could be done at a secondary operation.

DR. EDWARD W. PETERSON said that the age of the child was a large factor in the prognosis. Under one year of age 75 per cent. would die. Over two years a large proportion would get well. If a pneumococcic infection, in recent cases a large number would recover with simple incision.

DR. LLOYD, replying, said that operation should be performed early; that is, as soon as a diagnosis is made and the presence of an empyema definitely demonstrated. In many infants and small children, because of the barrel-shaped chest and wider intercostal spaces, a simple incision is sufficient and this will drain better in them than in older children. Expansion of the lung is the main thing to be attained. In order to get this one must first break down the adhesions and then irritate the pleura. The lung will then expand because of the closure of the glottis and increased intrapulmonary pressure. This point should be emphasized.

Tuberculosis of the Brain.—Roberto Alessandri (*Ann. of Surg.*, February) says that the solitary tubercle is the commonest cerebral tumor in children, and especially in them the solitary tubercle is associated in about 73 per cent. of the cases with tuberculous meningitis. In adults it is relatively rarer and often single and uncomplicated. The tubercle is often situated in inaccessible regions of the brain. Few cases are operable. To allow of intervention the seat of the lesion must be definitely diagnosed. In 22 cases of cerebral tubercle collected by the writer the result of operation was favorable in 19, though in some of these the improvement was slight or absent. Of the 6 cases of tuberculosis of the cerebellum 4 died immediately; in 1, death occurred in two and a half months; in the other, in ten.—*American Journal of Obstetrics.*

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, February 12, 1907.

DAVID L. EDSALL, M.D., PRESIDENT.

SKIN DISEASES CAUSED BY THE VEGETABLE PARASITES.

DR. F. C. KNOWLES showed several patients and photographs of cases illustrating tinea favosa, tinea tonsurans, tinea kerion, tinea circinata and tinea cruria. In order to make the subject of parasitic diseases more complete, photographs of tinea sycosis and tinea versicolor in adults were also shown. A short paper giving a general outline of these diseases was read. The only form of treatment mentioned was Sabouraud and Noire's X-ray therapy for tinea of the scalp. Cases of alopecia areata and pityriasis rosea were shown for differential diagnosis. Thanks were expressed by the exhibitor to Drs. Stelwagon, Davis, Van Harlingen and Hartzell for the privilege of showing some of their patients and photographs.

SPINA BIFIDA.

DR. ELEANOR C. JONES presented a male infant of two months with spina bifida. The tumor was situated in the dorso-lumbar region. It was 11 cm. long and 5 cm. wide. The spinal canal was open the entire length of the tumor, for the spinous processes were lacking. The child also had hydrocephalus. The lower extremities were paralyzed and anesthetic. The left foot showed a slight degree of talipes varus. When the infant was suspended by its head there was increased tension in the tumor, and when suspended by the feet the fontanel became more tense. Dr. Jones thought that a diagnosis of syringomyelocoele was warranted in this case.

DR. C. A. E. CODMAN and DR. J. H. JOPSON reported a case of imperforate anus in which the rectum terminated in the bladder. (See page 683 for complete report.)

DR. ALEXANDER H. DAVISSON reported as a clinical note a case of

APHASIA IN TYPHOID FEVER.

The patient, a girl of ten years, had a moderately severe, but uncomplicated, attack of typhoid fever. For seven days the child was in a condition of stupor, and during the eight days following this, though she could be aroused and was cognizant of her surroundings, she could not talk. She evinced her chagrin at this inability by a whining cry. Toward the end of this period she nodded her head "yes" and "no." Speech returned abruptly. The aphasia was not during the period of stupor, but following it. There were no mental complications.

DR. C. A. FIFE read a paper upon Buttermilk Feeding with report of cases.

SOME INFANTS FED UPON BUTTERMILK.

DR. HOWARD C. CARPENTER reported the results in 12 cases fed upon buttermilk. Five of the patients were treated in an institution, while the remaining 7 were treated as out-patients. They ranged in age from one to fifteen months, and were all seriously ill when this method of feeding was begun. They were losing weight, and were passing undigested milk in their stools. Eleven of the 12 patients did very well, while in all the character of the stools greatly improved as soon as they were given the buttermilk. The average gain in weight for the 12 infants while taking the buttermilk was 8 ounces a week.

RESULTS OF CASES FED UPON BUTTERMILK.

DR. C. F. JUDSON and DR. R. O. CLOCK reported the results in 12 cases of marasmus, malnutrition, enteritis and enterocolitis. Eight of the 12 cases improved, with average weekly gains of from 4 to 6 ounces. One of the 4 cases which failed to gain was a premature infant; 3 were complicated by gastritis, and were given buttermilk only for a short period (less than a week). The buttermilk was modified by dilution with cane-sugar solution (6 or 9 per cent.) so as to make the casein percentage in the mixture $1\frac{1}{2}$ to 2 per cent. Cream was added, little by little, to increase the percentage of fat to 2 per cent. The sugar percentage in the mixture was low (5 per cent.). The mixture was pasteurized for ten minutes at 140° to 155° F. More rapid gains in weight might have been obtained with a higher

percentage of sugar. The results were encouraging for this class of cases, and compared favorably with those obtained from peptonized milk formulae and whey-cream or dextrinized-gruel mixtures.

DR. D. J. MILTON MILLER said that he had been particularly interested in the percentage of failures as shown in these various reports. In Dr. Fife's series 33 per cent. showed no improvement, in Dr. Carpenter's 8 per cent., and in Dr. Judson's 25 per cent.

His own experience with this method of feeding was limited to 3 cases. One child did very well; 1 showed no improvement and 1 died. He had used buttermilk without flour. He saw no reason for the addition of flour, as he thought the curd is sufficiently broken up by the churning, and the necessary carbohydrate is supplied by the milk-sugar.

An Epidemic of Measles.—Leonardi (*Gazz. deg. Osped.*, February 4, 1906) points out certain facts he has observed in connection with an epidemic of measles (600 cases) which he had to do with in 1901-2. Without exact figures, he is under the impression that Koplik's spots were present in 50 per cent. of his cases, and sometimes for six or seven days before any signs of illness were noticed. It is, however, doubtful whether this early discovery is of much value as a prophylactic measure. A map of the course of the epidemic is given, showing how it proceeded steadily from south to north, a course due, in the author's opinion, to the direction of the upper air currents (places in the valley were unaffected). Like every one who has seen much measles, he strongly deprecates the view that it is a light and trivial disease that one must have, and so no special precautions need be taken. The mortality varied in different places from $1\frac{1}{2}$ per cent. to 28 per cent.; possibly the higher mortality may be accounted for by mixed infection, the measles, by weakening the resisting power of the tissues, allowing other germs to act more potently. It was more fatal in older children than in the very young. In addition to the many sequelæ left by measles, the author was much impressed by certain cases which developed mental weakness or joint troubles after the original disease.—*British Medical Journal*.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGER.

DR. HENRY HEIMAN.

DR. A. W. BINGHAM.

DR. M. NICOLL, JR.

DR. G. R. PISEK.

MEDICINE.

Schamberg, Jay F.: The Nature of Herpes Simplex, with a Consideration of its Diagnostic and Prognostic Significance in Various Infectious Diseases. (*The Journal of the American Medical Association*, March 2, 1907, p. 746.)

Schamberg reviews the points of similarity and dissimilarity between simple herpes and herpes zoster and shows the relative frequency of herpes in the infectious diseases. He says the fact that pneumonia, cerebrospinal meningitis and malaria should be so frequently accompanied by herpes, and, on the other hand, typhoid, smallpox and other exanthemata, so rarely, cannot in the present state of our knowledge be explained. His conclusions are that herpes zoster and herpes simplex are closely related. That the three diseases in which herpes develops with a fair degree of constancy are pneumonia, spotted fever and malaria. To individuals, however, with a tendency to herpetic attacks we are not to accord the full diagnostic value.

G. R. PISEK.

Foster, N. B.: The Etiology and Diagnosis of Epidemic Cerebrospinal Meningitis. (*American Medicine*, January, 1907, p. 30.)

The first authentic reports of this disease date from 1805 to 1830, when it was known as "typhus cereбрalis." It became prevalent again in 1840, and in 1875 the third epidemic, which has not yet passed, appeared in Sweden.

The means of infection are not known. Flexner and Barker have excluded air, soil and water as carriers. Some parasite may be the intermediary host, possibly the bed-bug.

The most important point in the etiology is the avenue of infection, for as long as this is unknown little in the way of prevention can be done. A special German commission has decided that infection does not occur by way of the cribriform plate, but through the pharyngeal tonsil, the sphenoid bone, the sella turcica and the pituitary body.

During epidemics mistakes in diagnosis are not likely to oc-

cur; nevertheless, the early symptoms are so varied and the severity of the attacks so uncertain that it is often a very puzzling disease.

LOUIS C. AGER.

Koplik, Henry: The Clinical History and Recognition of Tuberculous Meningitis. (*The Journal of the American Medical Association*, April 6, 1907, p. 1,149.)

To-day it is possible, according to Koplik, because of our advanced clinical methods, to approach a case of possible tuberculous meningitis with greater certainty than was possible in past years. The diagnosis is feasible, if based upon the slow onset, interrupted by periods of irritability, the irregularity of the pulse and respiration, the low or normal temperature, the absence of hyperesthesia, anorexia, the discovery of hydrocephalus by skull percussion, and is further confirmed by examination of the sub-arachnoid fluid.

G. R. PISEK.

SURGERY.

Moltschanoff, W.: The Operative Treatment of Diphtheritic Laryngeal Stenosis in Infants. (*Jahrbuch für Kinderhk.*, January 9, 1907, p. 64.)

Moltschanoff tabulates the cases of laryngeal stenosis that were admitted to the Moscow University Children's Clinic during the years 1895-1904, when they were treated with antitoxin injections, and intubation when necessary. Intubation, according to the author, is indicated on the first appearance of slight permanent cyanosis of the lips and retraction of the soft parts of the chest. Three hundred and eight cases were admitted, 69 of whom died—a mortality of 22.4 per cent.—193 cases were intubated. Of these, 21 were not above one year of age; 10 of the intubated infants died—a mortality of 52.4 per cent. The complications were as follows:—Bronchitis, 2 cases; catarrhal inflammation of the lungs, 3 cases; laryngeal ulcer due to pressure of the tube, 1 case; convulsions, 1 case. In 3 cases there was difficulty in inserting the tube, but even in an eight weeks' old child intubation was accomplished after repeated attempts. No primary tracheotomies were performed, and in only 8 cases was a secondary tracheotomy necessary. In these the mortality was 62.5 per cent. No cases of

obstruction of the tube were seen, and in only 2 cases was feeding difficult. The author concludes that even in young infants intubation is preferable to tracheotomy.

HENRY HEIMAN.

Brown, George V. I.: Conservatism in the Treatment of Infants with Harelip and Cleft Palate. (*The Journal of the American Medical Association*, March 2, 1907, p. 754.)

Brown gives certain facts bearing on conditions common to all such cases. (a) The infant should be in the best possible condition for operation. (b) Delay until operation can be done with reasonable assurance of safety, meanwhile reducing the fissures, and correct the asymmetrical condition as much as possible. (c) Subdivide the operative steps. (d) Use normal salt solution and nutrient liquids to replace fluids lost through hemorrhage. (e) Least possible amount of anesthetic. (f) Allow sufficient intervals for recovery between operations and yet have both lips, hard and soft palate complete, before speech habits have become fixed.

G. R. PISEK.

HYGIENE AND THERAPEUTICS.

Morse, John Lovett: The Dietetic Treatment of Enterocolitis. (*British Medical Journal*, October 13, 1906, p. 929.)

The food should always be stopped entirely for a longer or shorter time, according to the severity of the illness and the ability of the infant to stand starvation. All babies stand starvation well for twenty-four hours, most of them for longer, providing they are given a sufficient amount of water. They must be given at least as much water in twenty-four hours as they normally get in their food. This must be given regularly by the month, by the intestine, or subcutaneously.

After the period of starvation these patients should be fed for a time on some substitute for milk, as a rule on some form of starch and sugar, such as barley-water and milk sugar. Albumen water, beef-juice and broth may be used when proteids seem indicated. The amount of liquid must be kept up to the required limit just as in the starvation period.

It is seldom wise to begin milk when the temperature is much

above the normal, but the return to milk should not be delayed longer than a week, even if the temperature and character of the stools are not quite normal.

Generally at first a modified milk, prepared from fresh milk, low in all its percentages, feebly alkaline and pasteurized, should be given in small amounts at frequent intervals. It is often better, however, to begin with whey mixtures, peptonized mixtures, or barley mixtures, than with straight modifications. Buttermilk, pasteurized or not, may also be used with good results. The whey or buttermilk may be strengthened by the addition of cream as the patient improves; or, if it is on a modified milk, the percentages of the mixtures may be increased, together or singly, and the intervals of feeding lengthened until the strength and intervals suitable for a normal infant of the given age are reached. When the time for using milk comes, breast milk will sometimes result in cure in cases which otherwise seem hopeless.

A. W. BINGHAM.

Delearde, M.: A Salt Free Dietary in the Treatment of Scarlet Fever and Acute Nephritis. (*L'Écho Médical du Nord*, January 20, 1907, p. 25.)

Salt in small quantities has been often shown to be indispensable to the health of the normal body, but in the way it is ordinarily employed (as a condiment) it passes as waste product through the urine and feces. Most articles of diet contain in themselves a sufficient quantity of salt. If the kidneys become affected and their activity diminished, excess salt is stored in the tissues, which then call for water as a solvent, thus causing edema.

While milk diet is not to be wholly condemned, the writer calls attention to the fact that in giving a sufficient quantity to keep up nutrition, a considerable amount of salt is ingested, which may act as an irritant to the kidneys, and, furthermore, milk is not regarded as sufficiently sustaining during the period of convalescence in scarlet fever when the patient should be fortified against the ravages of secondary infection. During the stage when the throat is red and swollen, porridge, broths and eggs may be given, and later, meats, fish, vegetable purees, eggs and bread, all unsalted. Diuretics are administered as a matter of routine. A series of cases successfully treated according to this *régime* are cited by the author.

M. NICOLL, JR.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

OCTOBER, 1907.

[No. 10.]

Original Communications.

GRIP MENINGITIS.*

BY SAMUEL S. ADAMS, M.D.,
Washington, D. C.

At 6 P.M., January 1, 1907, I was summoned to see E. S. M., male, white, five years old, American, because he "had bitten off the bulb of a thermometer." It was noticed by his nurse, a competent French woman, that he ate very little luncheon, but he was taken in his pony cart to the Zoo. Here he took no interest in the animals, but seemed to be unusually quiet. Upon reaching home at 5 P.M., he seemed "drowsy and feverish," so his nurse attempted to take his temperature under his tongue, as she had frequently done, when his jaw quivered and he bit the thermometer. The pieces of the thermometer were fitted and the parents were assured that he had swallowed neither glass nor mercury. As he seemed very drowsy and hot I took the rectal temperature, which was 106.4° F. His mother expressed the belief that he had an attack of indigestion, such as he had had many times, and I concurred in this opinion, as there was no evidence of organic disease. I gave him a tablespoonful of sodium bicarbonate in a quart of warm water by rectum, which he retained for more than an hour; it was then passed and was slightly colored by fecal matter. He was also given a bath at 100° F. for ten minutes. At midnight his condition had not improved, and the treatment was repeated, but without effect upon the temperature or bowels. He was also given calomel, gr. j., resorcin, grs. ij., in ten divided doses.

January 2nd, A.M.—He had been vigorously treated by baths during the night, but his condition had changed only slightly.

* Presented before the Nineteenth Annual Meeting of the American Pediatric Society, at Washington, D. C., May 8, 1907.

Temperature was 106° , pulse 140, respiration 36. Considering the high temperature, his intelligence was good and he begged for his breakfast. The idea of indigestion was now dispelled and I excluded cerebral, cardiac, pulmonary, gastroenteric and urinary diseases, and expressed the belief that the child had a severe attack of grip, with such cerebral manifestations as are usual with hyperpyrexia. After impressing upon the parents the gravity of the condition, attention was directed to controlling the temperature by ice cap and sponge baths, to feeding and to the administration of a mild febrifuge. The temperature gradually subsided during the day and had fallen to 101° by 10 P.M. He had been restless and gritting his teeth, and showed only slight improvement mentally. His urine was found to be normal.

January 3rd, A.M.—Had a very restless night. Had several dark stools. Was sponged every two hours. Complained of headache and of being tired. Temperature reached maximum of 105.2° during day. Restless, gritting teeth; pain in back of neck; cried out when moved; headache and talked to himself.

Dr. W. D. Booker in consultation at 5 P.M.—He confirmed diagnosis of grip. He also attributed cerebral symptoms to high temperature.

January 4th, A.M.—Condition unchanged. During day temperature at lower range, but nervous symptoms unchanged. At midnight he seemed more comfortable.

January 5th, A.M.—Two chills last night, one at one and the other at three; temperature reached 105° . A third chill at 5 A.M. Sleep restless, talked in sleep. Constantly complained of being cold. Answered questions intelligently and politely. At noon had a chill. 3 P.M.—Dr. W. S. Thayer in consultation. He also agreed with the diagnosis and the treatment. During the past twenty-four hours the child had been given 2 grains of quinin every three hours, and, as there was a remission in the temperature, it was thought best to continue it. Early in the afternoon Dr. E. B. Behrend examined the blood and reported as follows:—

January 5, 1907.

Red blood cells	4,250,000
Leukocytes	10,800
Hemoglobin	90%
Color index	1.05

Differential count:—

Polymorphonuclears	88%
Small lymphocytes.....	10%
Large lymphocytes.....	2%

Stained specimen showed nothing of pathological importance. Malarial parasites absent. Attention having been called to a slight earache which the child had for a few minutes several days prior to his illness, I asked Dr. Joseph H. Bryan to meet me at 6 P.M. He found the left drum normal and a slight redness of the right, but expressed the positive opinion that there was neither middle ear nor mastoid disease, nor did he believe the ear had anything to do with the condition. However, he suggested having the ear irrigated frequently with a warm normal salt solution, which was done.

January 6th, A.M.—Slept quietly about ten minutes at a time. Three chills during the night, temperature reaching at one time 105.4°. As yet no positive symptom of meningitis had developed. There had been no muscular twitchings and the pain in the neck had abated. He answered questions, seemed to know different persons, but was excited and talkative.

Noon.—In consultation, Drs. W. S. Thayer, Joseph H. Bryan and W. H. Wilmer. Dr. Thayer called attention to the beginning of Kernig's sign, but an absence of every other symptom indicative of meningitis. Dr. Bryan pronounced the ear better and reassured us that it was not causing the trouble. Dr. Wilmer said the eyes were normal and presented no evidence of brain disease. There was noticed an exaggeration of a congenital internal squint of the left eye.

The consultation confirmed the diagnosis that had been made the second day of the illness.

P.M.—Two chills during the afternoon and very restless.

January 7th, A.M.—There was but little change in his condition. He became so restless and noisy during the night that Dr. Grasty, who was watching him, ordered morphine sulphate gr. $\frac{1}{10}$, hypodermatically, which quieted him for several hours.

In consultation, Drs. Thayer, Bryan and Wilmer. Nothing more positive determined. Kernig's sign a little more marked, but no other manifestation of meningitis. Stupor more marked and nothing intelligent spoken, nor did he recognize anyone, and

there was some doubt about his seeing objects, although occasionally his eyes followed the candle. Defecation and urination involuntary.

January 8th, A.M.—Condition worse. Two chills.

Noon.—In consultation, Drs. Thayer, Bryan and Wilmer. Symptoms of meningitis were now present, such as marked Kernig's sign, ankle clonus, retracted head, congestion of the fundus of the eye, and coma. It was now agreed that it would be proper to do lumbar puncture, so at 4:30 P.M., with the assistance of Drs. Behrend and Prentiss Willson, I drew off two ounces of cerebrospinal fluid, which was examined by Dr. Behrend, as follows:—

Two ounces of fluid were obtained from the spinal cord by lumbar puncture. This was quite turbid, and there was an immediate deposit of thick viscid pus. A smear made from the pus contained a large number of small delicate bacilli which were partly free and partly enclosed within the leukocytes. As many as eight or ten were found in some of the cells. The free bacilli were single, arranged in short chains, end to end, the smallest appearing as diplococci, so that the first impression was that we were dealing with a mixed infection. This appearance of diplococci was due to the selective or polar staining of the organism.

The ordinary laboratory media, including human blood agar, were inoculated with the pus. There was no development after forty-eight hours on any except the blood serum and human blood agar.

On blood serum there were fine glistening pin-point and colorless drops. On the blood agar there were fine glistening dot-like points larger than on the blood serum, discrete and translucent. Here and there were a few areas where the colonies became confluent. Under the low power they were round with sharp outline, glass clear and not granular. Subcultures from the blood serum and blood agar failed to grow. Cultures made from the spinal fluid forty-eight hours after removal failed to develop. Smears made from the cultures showed the presence of many small rods about one-quarter the size of a red blood corpuscle. There were also a number of quite large bacilli, much larger than the size usually attributed to the grip bacillus, frequently slightly curved, with a tendency to polar staining. The organism did not take Gram's stain. The bacilli were not motile, and grew only at the temperature of 37° Centigrade.

A careful consideration of the cultural and staining qualities of this organism leads to the conclusion that we are dealing with the bacillus of influenza. The diplococcus-like forms and the rather long rods found now and then are not quite in accordance with the typical description, but have been noted by other observers (Mallory and Wright). With this exception, it corresponds with everything that is known of Pfeiffer's bacillus.

(Signed) EDWIN B. BEHREND.

In two or three hours after the removal of the fluid there was a perceptible improvement in the child's condition. He recognized the voices of his brother and sister, took his treatment with less agitation and his temperature fell 3° . This abatement encouraged those about the bedside, but it was explained that it would probably not last long.

January 9th, A.M.—As had been predicted, he became worse during the night, had a severe chill which lasted half an hour and the temperature rose to 106.2° . By noon he was so much worse that I yielded to the entreaties of his mother, and, with the same assistance, drew off one ounce of cerebrospinal fluid. This procedure was not well borne, and he collapsed.

6 P.M.—In consultation, Drs. Thayer, Bryan, Wilmer, Behrend and C. C. Marbury. The child was now considered to be *in extremis*, but Drs. Behrend, Willson and I thought the bad symptoms might be attributed to the lumbar puncture. The consultation was dissolved.

January 10th.—Slight improvement this morning and became much brighter last night. When drops were put in his eyes he felt in his pajama pocket for his handkerchief and then wiped his eyes with his hand. During the afternoon he had a chill, lasting one and one-quarter hours, the temperature being 105.2° .

January 11th.—Had a fair night, but his respirations increased this morning. During the day he was kept alive by free stimulation, and by hypodermoclysis and rectal injection of salt solution.

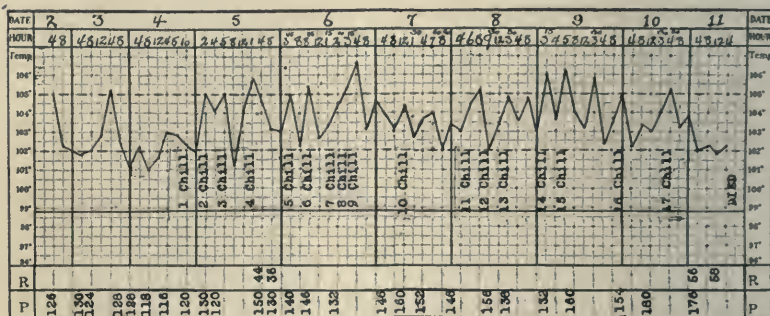
Death came at 9 P.M.

Throughout the attack the nourishment was kept up by liquid food, and stimulation was withheld until the last few days of life.

For the last six days of the illness a physician was in the house day and night, so that every change was observed and intelligently treated.

The reasons for making the diagnosis of grip after the first twelve hours were:—

1. Other members of the family were recovering from it.
2. The patient had had a slight attack a week or so prior to this illness.
3. Other conditions which might have produced similar symptoms were excluded.
4. The course showed profound toxemia.



TEMPERATURE CHART: CASE OF GRIP MENINGITIS.

I am indebted to Dr. Prentiss Willson, of this city, for examining the literature of this subject and tabulating the published cases.

That meningitis has been recognized clinically as an occasional complication of influenza, especially since the pandemic of 1889-90, no one will deny, but in only a few cases was the diagnosis based upon bacteriological findings. In this paper only such cases as were confirmed by finding the microorganism in the cerebrospinal fluid or in the scrapings from the meninges are tabulated. As Pfeiffer described the organism which bears his name, and which is now accepted as the cause of influenza, in 1892, it is evident the diagnosis of influenzal meningitis could not have been made with certainty prior to this time.

In 1902 Ghon¹ reported 2 cases of meningitis caused by Pfeiffer's bacillus and also reviewed the cases already reported. He found 27 published cases, but in only 10 was the bacteriological evidence sufficient to warrant a positive diagnosis.

The first case was reported by Högerstedt,² in 1895, that of a man, aged fifty-one. There was no lumbar puncture. Cultures taken from the meningeal exudate at the necropsy contained

Pfeiffer's bacillus, associated with other organisms not specifically described.

Pfuhl,³ in 1897, reported a case in which the diagnosis was accepted by Ghon. Male, twenty-two years of age, upon whom lumbar puncture was performed. Cultures made from the exudate taken after death showed the Pfeiffer bacillus associated with the pneumococcus and the streptococcus. Haedke⁴ was the first to demonstrate that Pfeiffer's bacillus alone could cause meningitis. Lumbar puncture was made on a youth, aged eighteen, who had been ill five days. The operation was performed twice, but no organism grew on the culture, probably because blood agar was not used. Subsequently, cultures obtained on blood agar from the meningeal exudate showed Pfeiffer's bacilli. Cocci were also present, but were attributed to postmortem infection. In 1898 Fraenkel⁵ reported 2 cases in which the Pfeiffer bacillus was the only organism found. Lumbar puncture was not done, the diagnosis being made by cultures from the meningeal exudate. The first case was made in a male infant ten weeks old, and the second, also a male, aged nine months. The duration of the disease was in each case a month.

In 1899 Slawyk⁶ performed lumbar puncture twice upon a boy aged seven months. In this case Pfeiffer himself found the bacillus in pure culture. Duration of illness, fifteen days. Meunier's⁷ case, a girl aged sixteen months, terminated fatally after an illness of eleven days. There was no lumbar puncture, but Pfeiffer's bacillus was found in pure culture from meningeal exudate, from a focus of pneumonia and from the pleural surface.

In Peucker's⁸ case, a girl, aged five months, there was no lumbar puncture, but Pfeiffer's bacillus and a staphylococcus were obtained from cultures of the meningeal exudate.

Langer's⁹ case, a boy, aged nine years, recovered after an illness of twenty-seven days. Lumbar puncture was done and Pfeiffer's bacillus grown in pure culture.

Trailescu's¹⁰ case, a girl, aged six months, died after an illness of ten days. The fluid drawn by lumbar puncture showed Pfeiffer's bacillus in pure culture.

After reviewing the cases given above, Ghon¹¹ reported 2 cases. The first was a man, aged thirty-three. The meningeal exudate showed the Pfeiffer bacillus and a streptococcus. In the second case, a boy, aged eight months, lumbar puncture was per-

formed once and Pfeiffer's bacillus was found in pure culture. The child died in ten days and the same organism was found in a focus of pneumonia.

In 1897 Testevin¹² reported the following case, which Ghon overlooked:—A man, aged twenty-three, who had Pott's disease, developed meningitis and the cerebrospinal fluid, obtained by lumbar puncture, showed the Pfeiffer bacillus in pure culture. He lived six days.

To Testevin would seem to belong the credit of having first demonstrated the presence of the Pfeiffer bacillus in the cerebrospinal fluid, taken by lumbar puncture from a case of meningitis.

Hunter and Nuttall,¹³ in 1901, in a paper detailing the bacteriological findings in the cerebrospinal fluid, obtained by lumbar puncture from 9 cases of meningitis, found the Pfeiffer bacillus in 3. In all of the 9 cases intra and extra cellular diplococci were found. In the second and fourth cases there was also present an organism, which they considered the influenza bacillus; also in the eighth case the same germ and a large capsulated bacillus were associated with the diplococcus. All were boys, aged respectively three years, four months, and one year.

In 1902, in addition to the cases reported by Ghon, two reports valuable to the literature of this subject were made by Simon¹⁴ and Dubois¹⁵. Simon's case was a boy, aged seven months, upon whom lumbar puncture was performed four times, and Pfeiffer's bacillus found in pure culture. The child lived about six days. An interesting account of the bacteriological and postmortem examinations of this case is given in detail.

Dubois's¹⁶ thesis is probably the best consideration of the subject. He translates into French the cases reported by Haedke, Fraenkel, Slawyk, Langer, Trailescu and by Ghon, in which the organism was present in pure culture, and a full quotation of the cases originally reported in French by Testevin, Meunier and Simon. Dubois's case was a boy, aged four months, the duration of the disease being fifteen days. The cerebrospinal fluid, obtained by lumbar puncture, showed the Pfeiffer bacillus in pure culture. The child died.

Hecht,¹⁷ in 1903, reported a case in a boy aged two years. Lumbar puncture was performed twice and the diagnosis established by this means, but the influenza bacillus was not found in pure culture. Duration of illness, ten days.

In 1903 Mya reported 4 cases. In his first communication¹⁸ 3 cases were presented. The first was a girl, aged eight months, who, when first brought to the clinic, had an area of bronchial breathing at the base of the left lung, in addition to meningeal symptoms. Three lumbar punctures were made and the fluid withdrawn showed the influenza bacillus in pure culture. Duration of illness, twelve days. Death.

The second case was a boy, aged one year, who had been transferred from the surgical ward upon the development of meningeal symptoms. He had a suppurating arthritis of the right shoulder joint. Lumbar puncture was made once and the fluid showed the bacillus of Pfeiffer in pure culture. Death five days after the first evidences of meningitis.

The third case was seen in consultation. A boy, aged nine months, was taken with meningitis about the middle of June. He also had a bronchopneumonia at the left base, a corneal ulcer, a suppurating otitis of the left ear, and left facial paralysis which antedated the otitis by more than two weeks. The fever subsided about the first of August, but emaciation progressed until the middle of September, when he was reduced to profound cachexia. He gradually improved after this, although left facial paralysis and partial right hemiplegia were present. Three lumbar punctures were made and a total of 105 c.c. of fluid was withdrawn. The Pfeiffer bacillus in pure culture was found.

In his second contribution,¹⁹ also made in 1903, Mya reports the case of a boy, aged one year, who was first brought to his clinic for a fall which caused a hematoma of the scalp, in the right occipito-parietal region. Fracture was not detected, and, there being no nervous symptoms, the child was sent home. He was brought back in about two weeks, with bronchopneumonia associated with meningeal symptoms. There was also suppuration of the hematoma. Lumbar punctures and also punctures of the pneumonic area and the hematoma were made. The fluids from the three localities showed the Pfeiffer bacillus in pure culture. The child died and a lineal fracture in the right occipito-parietal region was found. Mya expresses the opinion that the primary focus of infection in this case was the lung, a secondary infection of the pre-existing hematoma, and then of the meninges taking place. In concluding the paper the author expresses the opinion that Pfeiffer's bacillus is as much of a factor in the production

of cerebrospinal meningitis as the diplococcus or pneumococcus, especially in infants.

In 1904 Bertini²⁰ reported 2 cases, seen in the service of Professor Concetti, of the Royal University, at Rome. The first case was a boy, aged eleven months, who entered the clinic, the fourth of the month, with a history of an attack of grip. He now had a mild bronchopneumonia. The following day meningeal symptoms developed, and he died on the 7th. Lumbar puncture was done once and the fluid showed the Pfeiffer bacillus in pure culture. Autopsy revealed a confluent bronchopneumonia and a bilateral exudate, and the meningeal lesion.

The second case was in a boy, aged six years, which terminated fatally in ten days. Lumbar puncture demonstrated the presence of the Pfeiffer bacillus, but not in pure culture. Autopsy revealed a slight bronchopneumonia.

In the same year Jundell²¹ also reported 2 cases. The first case, a girl, aged eight months, terminated fatally in twenty-two days. The fluid drawn by lumbar puncture showed the Pfeiffer bacillus in pure culture.

The second case, aged eighteen months, ended fatally in sixteen days. Lumbar puncture was not performed, but the influenza bacillus was found in the meningeal exudate obtained at the necropsy.

Thomesco and Gracaski²² reported a most interesting case in 1904. A child, aged seven years, recovered in ten days. The fluid obtained by lumbar puncture showed the Pfeiffer bacillus. Unfortunately, the original article could not be consulted, the publication not being in the Surgeon-General's Library at Washington, D. C. The facts are, however, taken from an abstract published in a French journal.

In 1904 Chekhovich²³ reported a case in which the diagnosis was made upon clinical evidence, as neither lumbar puncture nor autopsy was made.

In 1905 Ihara²⁴ published an article, but it was impossible to find anyone who could translate it into English. From what could be gathered from the translation by a Japanese dental student the article is simply a translation of published cases.

The last case found in the literature was reported by Douglas²⁵ in 1907. A girl, aged ten months, died after an illness of eight days. The Pfeiffer bacillus was found in pure culture in the fluid

removed by lumbar puncture and in the meningeal exudate obtained at the necropsy.

Below is a tabulated statement of the cases in which the Pfeiffer bacillus was found in pure culture:—

MENINGITIS DUE TO PFEIFFER'S BACILLUS IN PURE CULTURE.

	AGE	SEX	DURATION	RESULT	LUMBAR PUNCTURE	AUTHOR	DATE
1	18 years	Male	5 days	Death	Twice	Haedke	1897
2	23 years	"	6 days	"	Once	Testevin	1897
3	10 weeks	"	1 month	"	.....	Fraenkel	1898
4	9 months	"	1 month	"	.....	Fraenkel	1898
5	9 months	"	15 days	"	Twice	Slawyk	1899
6	16 months	Female	11 days	"	.....	Meunier	1900
7	9 years	Male	27 days	Recovery	Once	Langer	1901
8	6 months	Female	10 days	Death	Once	Trailesco	1901
9	8 months	Male	10 days	"	Once	Ghon	1902
10	7 months	"	6 weeks	"	4 times	Simon	1902
11	4 months	"	15 days	"	Once	Dubois	1902
12	8 months	Female	12 days	"	3 times	Mya	1903
13	1 year	Male	3 days	"	Once	Mya	1903
14	9 months	"	6 weeks	Recovery	3 times	Mya	1903
15	1 year	"	?	Death	Once	Mya	1903
16	8 months	Female	20 days	"	Once	Jundell	1904
17	18 months	?	16 days	"	.....	Jundell	1904
18	11 months	Male	4 days	"	Once	Bertini	1904
19	7 years	"	10 days	Recovery	Done	Thomesco and Gracaski	1904
20	10 months	Female	8 days	Death	Once	Douglas	1907
21	5 years	Male	12 days	"	Twice	Adams	1907

It will be seen that 19 of the 21 reported cases were in children, of whom 16 died. Lumbar puncture was performed during life in 17 cases and the diagnosis was definitely determined by finding the bacillus in pure culture.

In conclusion, it may be stated that my case is the first case of grip meningitis reported by an American in which the diagnosis has been confirmed by finding the Pfeiffer bacillus in pure culture in the cerebrospinal fluid removed by lumbar puncture during the life of the patient.*

1 Dupont Circle.

BIBLIOGRAPHY.

1. Ghon. Wien. Klin. Woch., Nos. 26 and 27, 1902, pp. 667 and 700.
2. Högerstedt. St. Petersburger Med. Woch., Vol. XX., 1895, p. 123.
3. Pfuhl. Zeitsch. für Hygiene, Vol. XXVI., 1897, p. 112 (second case).
4. Haedke. Münch Med. Woch., Vol. XLIV., 1897, p. 806.
5. Fraenkel. Zeitsch. für Hygiene, Vol. XXVII., 1898.
6. Slawyk. Zeitsch. für Hygiene, Vol. XXXII., 1898.
7. Meunier. Comptes Rend. de la Soc. de Biol., Tome II., 1900, p. 5.
8. Pencker. Prager. Med. Woch., Vol. XXVI., 1901, p. 153.

* The discussion of this paper will appear in the November number of ARCHIVES OF PEDIATRICS.

9. Langer. *Jahrb. für Kinderheilk.*, Vol. LIII., 1901, p. 93.
10. Trailescu. *Spitalul*, Vol. XXI., 1901, p. 474. Abstract in *Münch. Med. Woch.*, Vol. XLIX., 1902, p. 118.
11. Ghon. *Loc. Cit.*
12. Testevin. *Dauphiné Médical*, Vol. XXI., 1897, p. 49.
13. Hunter and Nuttall. *Lancet*, June 1, 1901, p. 1524.
14. Simon. *Bull. de la Soc. Anatom. de Paris*, April, 1902, p. 382.
15. Dubois. *Thèse de Paris*, November 27, 1902, No. 49.
16. Dubois. *Loc. Cit.*
17. Hecht. *Jahrb. für Kinderheilk.*, Vol. LVII., 1903, p. 333.
18. Mya. *Gaz. Degli Osped.*, Vol. XXIV., 1903, p. 268.
19. Mya. *Riv. Clin. Pediatrica*, Vol. I., 1903, p. 465.
20. Bertini. *Riv. Clin. Pediatrica*, Vol. II., 1904, p. 673.
21. Jundell. *Jahrb. für Kinderheilk.*, Vol. LIX., 1904, p. 777.
22. Thomesco and Gracaski. *Bull. de la Soc. des Sc. Méd. de Bucharest*, Vol. II., 1904. Abstracted in *Révue Neurologique*, 1905, p. 44.
23. Chekhovich. *Rusak. Urach.*, St. Petersburg, Vol. III., 1904, pp. 571-573.
24. Ihara. *Iji Shimbun*, Tokyo, February 25, 1905, p. 162.
25. Douglas. *Lancet*, London, January 12, 1907, p. 86.

Common Symptoms of Disease in Children. — Robert Hutchison (*Clinical Journal*, February, 1906) brings up a number of practical points in connection with abdominal pain in children. The first group of causes are extra-abdominal, the pain merely being referred. These include spinal caries, pleurisy, hip disease and rheumatism. Of abdominal causes the most common is intestinal colic. Gastric pain is unusual in children, as they rarely suffer from organic diseases of the stomach, but frequently from functional disturbances, and these rarely cause actual pain. Chronic appendicitis, to be diagnosed by palpation, round worms, and pain due to passage of uric acid or small stones down the ureters are not to be forgotten. In rare cases the pain is actually of gastric origin, from hyperacidity, for example. The fact that the pain begins soon after meals does not necessarily indicate that the stomach is its site, as eating may start intestinal peristalsis. Among the common causes of dysphagia the writer mentions congenital adenoids, cleft palate, mental deficiency, paralysis of the palate from diphtheria, irritability and congestion of the pharynx associated with enlarged tonsils, and simple perverseness of the child, who resents the change from the bottle to solid diet.—*American Journal of Obstetrics.*

THE USE IN PRACTICE OF THE THEORETICAL RESOURCES PROVIDED BY PERCENTAGE FEEDING.*

BY CHARLES HUNTER DUNN, M.D.,

Boston, Mass.

The problem of the artificial feeding of infants has long formed one of the chief subjects which have engaged the earnest study of pediatricists, with the result that our theoretical knowledge of underlying principles has been greatly enlarged. The chief step in advance has been the recognition of the chemical nature of the problem, and the general principle of percentage feeding. This principle, by which cow's milk is so modified that the percentages of its chief component elements are rearranged, owes its inception to the study of the differences in the chemistry of cow's milk and human milk, and to the attempt to produce a food which shall as closely as possible imitate that food which nature provides. Although it was found impossible to imitate nature exactly, much has been accomplished in this direction. The fact that as close as possible an imitation of the average human milk did not provide us with a universal baby food, led to a second great step in advance, namely, the recognition of the fact of the individual idiosyncrasy of every baby's digestive powers and requirements. Here the variation is infinite, but fortunately the very method employed in modifying cow's milk does not alone suffice to produce an imitation of the average human milk, but is so exceedingly elastic as to provide us with an infinite number of percentage combinations, to serve as resources against these variations in the infant's requirements.

Nevertheless, the fact remains that, to practitioners generally, the problem of infant feeding has remained a very difficult one. The use of modified milk has only too often resulted in failure; and as a result has come a constant demand upon those engaged in the study of the problem for new resources. Consequently, in the endeavor to provide further resources, pediatricists have devoted to the subject a further amount of study. The chemistry of cow's milk and of its digestion has been studied with the greatest thoroughness and detail, and these studies have been carried to a marvelous extent of scientific research. They have resulted

* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 7, 1907.

in the addition of further resources, which are based upon chemically scientific principles, but are not based upon the imitation of nature.

The failure of modified milk to meet the requirements of difficult feeding cases must be due either to limitations in the value of the resources provided by this method, or to improper application of these resources. The object of this paper is to suggest that it is due to the latter, and to present a plea for a more careful, scientific and thorough use of the resources of milk modification, and a more painstaking study of its results in practice, before jumping too soon to the conclusion that this method of dealing with the problem has such great inherent limitations as to call for a demand for other measures.

I believe that the demand for other resources is to a great extent based on a misconception. The difficulties encountered in the artificial feeding of infants with modified cow's milk are due to two factors. First, the inherent unsuitability of cow's milk to the digestion of the young human infant; and second, to the variation in the digestive power of different individual infants. The misconception I refer to is that too much stress has been laid upon the first of these factors, too little upon the second. When a number of cow's milk modifications fail to solve the problem, we recognize that the failure is due to the relative disproportion between the food and the infant's digestive power; but we are too apt to attribute the chief rôle to the unsuitability of cow's milk. We turn from the resources of milk modification and adopt other resources, based on chemical research. The measure adopted is at times successful, at other times it is not. In the latter case we are too apt still to blame the limited number of resources at our disposal, and to engage in further study, with a view to adding some new resource.

I do not wish to be taken as denying the value of the resources with which scientific research has provided us. They all have great value as resources when properly used, and add to our stock of weapons in combating extremely difficult conditions. It is rather the relative value of proper percentage feeding based on the imitation of nature, and of these other resources, which I wish to place in question. When we have given up modification of human milk on the principles pointed out by nature and resort to other measures, no matter how scientific these measures, and how theoretically true the principles on which they are based, neverthe-

less, their use is at best but a blind groping, without any fundamental principle to guide us. The reason for this is that our diagnostic resources cannot reach the variation in the idiosyncrasies of the digestive powers and requirements of individual infants, which is the great dominating factor in the situation. So long as we are properly using simple modification of cow's milk, we have at least the great guiding principle of the imitation of nature.

Another reason for this tendency to seek out new measures for solving the problem lies in a desire to simplify the problem. Although realizing the fact of individual idiosyncrasy, many members of the medical profession cannot divest themselves of the old idea that there is somewhere a baby food to be discovered, or, at least, some resource which shall be of transcendent value in infant feeding. Consequently, there is a tendency everywhere for investigators to publish new measures, based, perhaps, on chemical study, with which they have had success. The publication of these measures is often really based on the hope that they may have such transcendent value, but is plausibly justified on the ground that they are at least new resources in a problem where every possible resource is needed. This last claim only is true, and they have value only as such. They do harm at times by conveying an impression of wider adaptability, and by preventing thorough trial of the resources toward which nature has pointed. There is danger that they cloud the real nature of the problem, which is not a simple one, and cannot be solved by any such discovery.

Among the resources provided by the modification of cow's milk is one which has been especially neglected. This is the use of the so-called split proteid. It is based solely and entirely on the imitation of nature. The chemical study of the proteids of cow's milk and human milk, respectively, disclosed the fact that there is a great difference in the composition of the proteid. In human milk, two-thirds of the proteids are soluble, consisting chiefly in the lactalbumin, and one-third is the curd-forming caseinogen. In cow's milk, on the other hand, but one-fifth is the soluble whey proteid, and four-fifths are caseinogen. Therefore, in human milk the formula is fat 4.00, sugar 7.00, whey proteid 1.00, caseinogen .50, whereas in cow's milk modified by cream dilution to imitate an average human milk, the formula is fat 4.00, sugar 7.00, whey proteid .30, caseinogen 1.20. We can, however, by using whey in our modifications, rearrange the relative percentages of

these two proteids to form a very close imitation of human milk, at least in so far as quantitative analysis goes, obtaining fat 4.00, sugar 7.00, whey proteid .90, caseinogen .50. Not only can we do this, but we can still further reduce the percentage of caseinogen, and have at our disposal a great number of resources by varying in different ways the relative percentages of these two proteids.

Although it has long been recognized that the caseinogen, with the resulting casein curds formed in digestion, is an important factor in the difficulty of digestion of cow's milk, and though this resource of modification, based entirely on the principles pointed out by nature, has long been in the hands of the profession, it has not been either properly or thoroughly tried. Physicians prescribe a formula containing 1 per cent. of proteid, and indigestion results. They then cut down the proteid perhaps to .25 per cent., and the infant does not gain, because the amount of proteid is not sufficient to meet the requirements of his metabolism. Such an infant is considered to be unable to digest modified cow's milk, and the physician resorts to cereal diluents, or peptonization, or chemical modification with alkalies, one of which may or may not be successful. Yet in such a case the infant will usually thrive if he is given a 1 per cent. proteid, in which the percentage of caseinogen is only .20 or .25 per cent., the rest being soluble proteid. The split proteid, such as nature provides, fulfills the requirements both of his digestion and his metabolism.

The only practical objection which has been advanced against this method of milk modification is that milk laboratories are not always available, and the method is too cumbersome for home modification, because on the one hand it involves too complicated mathematical calculations on the part of the physician, and, on the other hand, is too troublesome for the mother or nurse, and too difficult for her to learn. As to the first objection, the methods which have been devised for simplifying the calculations bring their proper performance within the range of anyone, and the physician who is going to attempt the solution of so difficult a problem as that presented by any case of artificial feeding should be thoroughly competent to perform them. The second objection is not founded on fact. If there is fear of overburdening the mind of the mother or nurse with too many directions, it is an easy matter to teach her first to make whey. This is quickly learned, and the substitution of whey for all or a part of the

boiled water does not impose much additional burden upon the mother's mind. We have found in Boston that even the most unintelligent mothers treated in the out-patient clinics have no difficulty in grasping this method of milk modification when it is properly explained to them.

In practice, this method is applied properly in the following manner:—The physician is confronted with a difficult feeding case. The first step is the diagnosis of the probable particular gastroenteric disease with which he has to deal. The second step is the careful study of the previous feeding of the patient, which involves the reduction of all the foods given, whether cow's milk modifications or patent preparations, to their percentage formulæ. This often gives valuable information both as to the infant's digestive power, and as to the particular elements in the food which his digestion cannot tolerate. The third step is the choice of therapeutic measures. In choosing, he should be guided by the initial probability that those resources which are nearest to nature are most likely to do good. Therefore he will choose modified cow's milk, with the split proteid. Let us suppose, however, that it is a difficult case, and no preliminary information is given which shall serve as a starting point. The principle is to begin with a very weak food, and find by experiment the limits of the infant's tolerance of its various elements, the goal being to find that food on which the greatest freedom from unfavorable symptoms is combined with the greatest gain in weight. If he begins with fat 2.00, sugar 5.00, whey proteid .25, caseinogen .25, and the symptoms improve without gain in weight, the split proteid enables us notably to increase the caloric value of the food without increasing the fat or the caseinogen, which are most likely to be the cause of the symptoms. In a very large proportion of cases, infants will be found to gain on fat 2.00, sugar 5.00, whey proteid .90, caseinogen .25. Next, the fat and the caseinogen can be alternately increased, by small successive steps, until the limit of tolerance of each is definitely determined.

If the formula used at the start does not relieve the symptoms the food should be weakened still more, possibly to plain whey, and then again fractional amounts of fat and caseinogen added in turn, until the limits of tolerance are found.

Some cases cannot be entirely freed of symptoms, but if this method is systematically pursued a food is found on which the patient will gain weight until his digestive power increases.

In Boston many of us have been using milk modification with the split proteid as a routine, in the way I have described, and I believe I can say that we all agree as to its immense value. The results have been most striking, not alone in the number of cases in which it can be actually demonstrated to be the means of solving the problem, but also in the light which its use has thrown upon the peculiar idiosyncrasies of the infantile digestion. It has disclosed cases which show a remarkable intolerance of caseinogen, in which every increase beyond .20 per cent. caused indigestion, although the total of 1.10 per cent. caseinogen obtained by the use of whey was sufficient for gain in weight. It has disclosed a second class of cases in which a similar intolerance appeared against even the smallest quantity of fat, while the caseinogen could be increased with impunity. Still other cases, which would not gain on the low proteid and fat which the poor digestive powers demanded, gained when the carbohydrate was increased, far beyond the usual limits, to 15 or 16 per cent. I believe that the chief value of the proper and systematic use of the method outlined above is the rapidity with which it enables the physician to discover the peculiarities of an individual infant's digestion, and caloric needs. By it cow's milk is divided into its elements, and the limit of tolerance of each element can be systematically tested. Feeding is then not hit or miss experimenting, but a definite experimenting directed toward a definite end. And if such an experiment is properly conducted, it results in finding the food most suited to the individual infant. In the most difficult cases, which, though rare, do exist, which cannot be fed by any of the formulæ offered as resources by this method of modification, it gives us a hint as to what other measures we shall try first.

Finally, as to some of these other measures advocated in infant feeding, based on the study of the chemistry of digestion, I wish to speak particularly of the widely employed use of cereal diluents. Those advocating this measure have laid great stress upon the significance of the curd in cow's milk, formed in the process of the digestion of its excessive caseinogen. It has been demonstrated that in the presence of cereal diluents curds are formed which are smaller and softer, and hence easier of digestion. Consequently, the use of such cereal diluents is advocated for the purpose of breaking up the curd. Now such cereal diluents contain starch, and nature does not designate starch as a proper part of the food of a young baby, nor of the food of

any other young mammal. The power of starch digestion develops later, and it is manifestly contrary to nature's purposes to give a food which calls for the use of a function which nature does not develop at this age. In practice, also, the giving of starch in the form of cereal diluents is often attended by a train of symptoms, disturbances both of digestion and of nutrition, which are testimonials to nature's protest. That starch often can be digested in the earlier months of infancy is no more an argument for its routine use, or use to break up the curd, than would the fact that some babies born prematurely at the seventh month survive without difficulty be an argument for the induction of premature labor. Later, when the coming of the teeth and other signs show that nature intends babies to have a wider variety of food, starch not only may but should be given, on the principle that when nature has developed a function it should be used. In the latter months of the first year the use of cereal diluents is an excellent thing, both in exercising a newly-developed function and at times in enabling a baby with weak proteid digestion to digest still larger amounts of proteid. But it should not be given simply for the purpose of breaking up the curd. Why give so much curd? Why should we call upon babies to digest this unnecessary caseinogen, when nature has never intended it, and when we have at our disposal a means of avoiding this unnecessary burden, and still give the infant its full proteid requirements, by a method based upon the imitation of nature's method?

Another measure widely advocated at present is also based upon the study of the chemistry of digestion, and is aimed at making easier the digestion of the excessive curd formed in the process of digestion of cow's milk. This is the use of alkalies such as lime water, sodium bicarbonate, or sodium citrate in cow's milk modifications, each of which has its own carefully worked out effect upon curd formation. The same arguments as those against the indiscriminate use of cereal diluents are for the most part applicable here, except that these substances are in themselves more harmless than starch. In some cases of gastric indigestion, especially where the taking of food is immediately followed by the vomiting of large curds, alkalies undoubtedly do good, by delaying curd formation. The working out of their exact chemical effect upon the casein is also an important addition to our knowledge of infantile digestion, and these effects may be valuable resources in particular cases, to meet certain indications, when used

for definite reasons. But their general use for the purpose of aiding proteid digestion is highly artificial, and is in great part unnecessary in view of our ability to use nature's method of dealing with this side of the problem.

The same considerations apply to peptonization. Properly used, to increase proteid tolerance, where increased proteid is indicated, and cannot be satisfactorily attained in other ways, it is a valuable resource in certain cases.

Abroad the study of the chemistry of digestion has been carried to still greater refinements with the result that a greater number of preparations are in use, the directions for the making of which are often highly complicated, and sound as if the product would be highly unsuitable. They are still more artificial than any in common use in this country, and still further removed from the principles which nature gives us as a guide. To my mind, the chief fault with infant feeding as practiced in Europe is that the investigators have entirely missed the nature of the problem as a whole, and have grasped only minor aspects. They have devoted attention in turn to various aspects of the chemistry of digestion, and have studied them in turn with remarkable scientific thoroughness. The deductions from this study are applicable only to single aspects of the problem, but they have been applied too widely and generally to the whole problem. A conception of the general nature of the problem, combined with a knowledge of many resources, and their scientific bases, is what is needed.

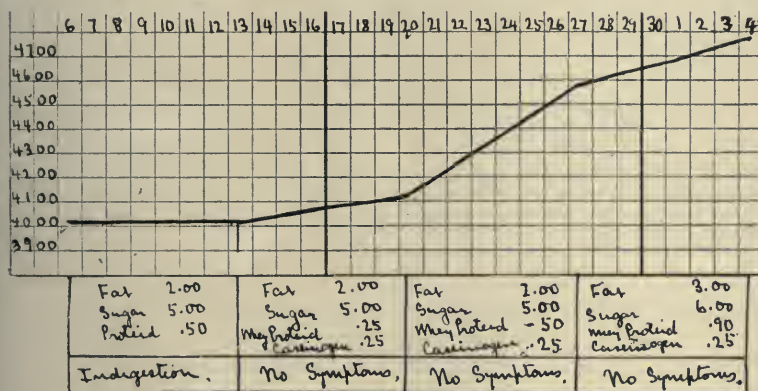
Any one of all these artificial measures may do good in individual cases, and the advocate of any of them will have no difficulty in multiplying testimonials to their good results in practice. But let us recognize that this fact is due to the infinite variety of the idiosyncrasies of digestion in artificially fed infants. It would be strange indeed if some infant could not be found to whose individual idiosyncrasies the method in question is exactly suited. Let us then, in these cases, frankly attribute our good results to this variety of digestive idiosyncrasy, not to the value of the measure employed.

We have at our disposal an immense number of resources, and our problem is the proper choice among them. Let us, in choosing, proceed in some regular and logical order. More depends, in accomplishing the desired result, upon how we choose among them than in the number at our disposal. In our choice we are, of course, influenced by the results of our experience. But we can-

not gain experience with all of these resources. Let us, then, choose first to gain thorough experience in the use of those resources which are most likely to be of value. Those resources which are most likely to be of value in practice are those whose theoretical basis is the imitation of the method which nature, through the long progress of natural selection, has chosen for herself.

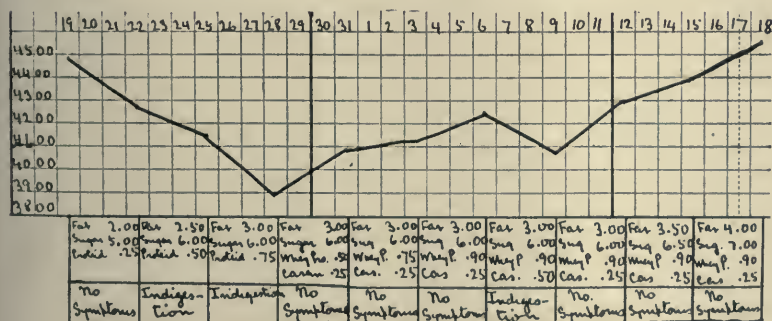
The following weight charts are illustrative of the method of percentage feeding outlined above:—

CHART I. EFFECT OF SPLIT PROTEID.



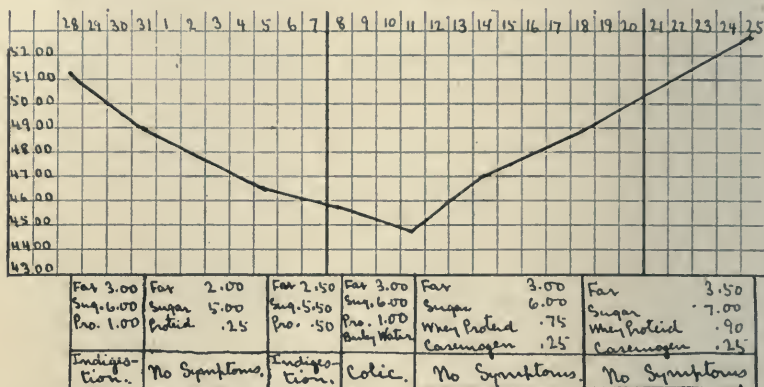
Indigestion with .50% protein, relieved when the same amount was given in the form of split protein. Gain in weight on increasing the whey protein.

CHART 2. EFFECT OF SPLIT PROTEID.



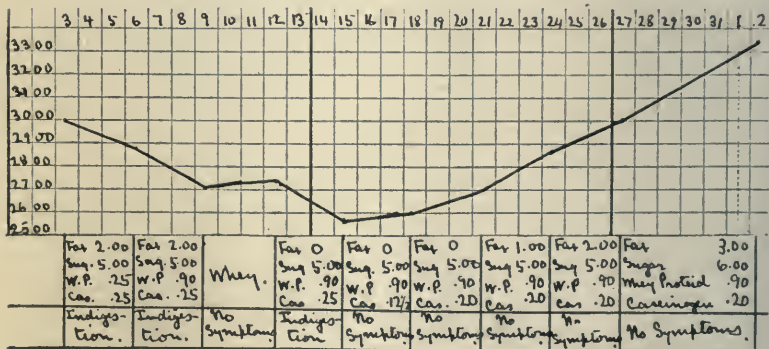
No gain in weight with unmodified protein. Gain in weight without symptoms with split protein. Indigestion recurred when caseinogen was raised to .50%, and was relieved when it was reduced to .25%.

CHART 3. COLIC WITH CEREAL DILUENT. EFFECT OF SPLIT PROTEID.



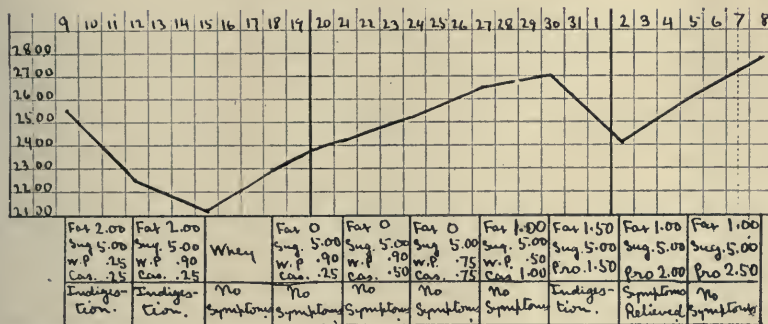
Vomiting with 1% proteid. No vomiting, but colic, with the same formula and cereal diluent. No symptoms and gain in weight with the same amount of total proteid (1%), but given in the form of split proteid.

CHART 4. MARKED CASEINOGEN INTOLERANCE.



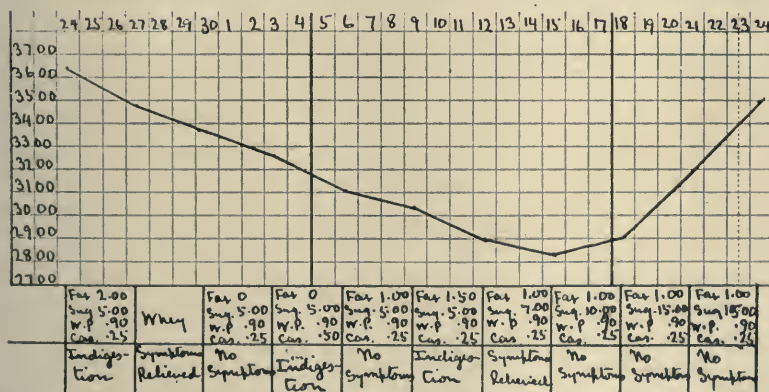
Indigestion with 2% fat and .25% caseinogen, relieved with whey. Symptoms reappeared when caseinogen was .25% and fat was 0.0%, but were relieved with gain in weight when caseinogen was .125% and .20%. Hence intolerance of more than .20% caseinogen, but no intolerance of 3% fat.

CHART 5. FAT INTOLERANCE.



Indigestion with 2% fat and .25% caseinogen, relieved with whey. No symptoms on increasing caseinogen to 2%. Fat could be increased only to 1%. With 1.5% fat the symptoms reappeared.

CHART 6. CASEINOGEN AND FAT INTOLERANCE. EXCESSIVE CARBOHYDRATE REQUIRED.



Investigation showed that the digestion could not tolerate fat above 1% and caseinogen above .25%. But with fat 1%, sugar 5%–7%, whey proteid .90%, caseinogen .25%, although symptoms were relieved, there was no gain in weight. When sugar was raised to 10% and 15% gain occurred.

SOME CONCLUSIONS FROM OUR KNOWLEDGE OF THE PROTEIDS OF MILK.*

BY THOMAS S. SOUTHWORTH, M.D.,
New York.

In order to understand the misconceptions and imperfect knowledge of the proteids of milk, which have long clouded the subject and delayed progress, a short historical survey may be useful.

For many decades, if not indeed for centuries, all milks used for feeding infants were regarded in much the same light. The only distinction consisted in labeling the milk, according to its source, as woman's milk, goat's milk, asses' milk or cow's milk. The milks derived from some of these animals were believed to agree better with infants than the milk of the cow, but when any reason was advanced for this position it was based solely upon the size or character of the curds which they formed. When an explanation of this phenomenon was sought, it was ascribed chiefly to the quantity of curd-forming substance present. Beyond this, all milks were considered to be similar.

The dawn of enlightenment began with the early chemical analyses. These analyses were, however, rather crude, and, although the fact was established that fat, proteids, sugar, salts and water existed in various milks in differing proportions, for all practical purposes, as applied to the feeding of infants, it was believed or assumed that these elements in the different milks were practically of the same chemical composition and properties. If this were true, it was but a natural step to the conviction that if cow's milk could be diluted and then fortified with cream and sugar to correspond with reasonable exactness to the average analyses of breast milk, the difficulties of artificial feeding would be finally disposed of.

Unquestionably this early and crude phase of "modification of milk" was an epoch-making advance, and by the happy chance of a low estimate of the proteid content of breast milk, due to the imperfect analytical methods then existent, proved reasonably successful. Hopes of a universal adaptability of this supposed counterpart of breast milk were, however, soon dashed by the inability of a considerable proportion of infants to digest this

* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 7, 1907.

substitute. The difficulty seemed sometimes to lie with the proteids and sometimes with the fat, and after various efforts to solve the problem by measures which should render the proteid more digestible, the really brilliant plan was devised of furnishing, with the aid of the milk laboratory, almost any reasonable variations in the proportions of the elements of cow's milk, and percentage feeding was launched with acclaim.

There was, however, one inconsistency in this effort to follow as far as possible the composition of breast milk, and this was the addition of a foreign substance—lime water. The addition of lime water seems to have crept in because it had been proved for many years to have a favorable influence upon digestion. Its use was explained upon the ground that it overcame the acidity which was then supposed to be one of the characteristics of cow's milk in contradistinction to woman's milk, and, furthermore, that it made the cow's milk resemble breast milk more nearly in taste.

Here, again, the matter rested for some years, the method meeting with ever-growing success, and attention being centered upon the study of the clinical indications calling for variations of the percentages, and upon the means of extending the processes of preparation from the laboratory to the home. A much narrowed group of infants, however, remained who did not thrive by this method, but who were benefited by resort to other plans of feeding involving the introduction into their food of still other substances not found by analysis in breast milk. Foremost among these was the use of cereal decoctions, a time-honored usage, improved by recent study. This plan did not call for the use of lime water in the milk mixtures, and in time the query has become insistent to know more definitely what influence each of these extraneous substances exerts upon the digestion and nutrition of the infant when employed in the modification of cow's milk.

Most essential for purposes of comparison is some statement of our present knowledge of human milk, and perhaps more especially of its proteids. Fundamental and important as it is that we should know the exact composition of breast milk, there is no question pertaining to infant feeding which is shrouded in greater uncertainty. This arises primarily from the great variability in the secretion of the human breast, not only in different individuals, but in the same individual at different hours of the day and under varying conditions of bodily estate. The quantity secreted by the human breast is relatively so small and the method

of obtaining it so far from normal that a sufficient quantity for ultimate chemical analysis must necessarily be made up of mixed milks. There is also a more than reasonable doubt whether even these individually represent the same composition as the entire content of the breast when drawn by the infant under the normal stimulation of nursing.

To this impossibility of securing ultimate analyses of individual breast milks is added the more serious one of accurately estimating the relative proportions of the different forms of proteid. The total nitrogen content can, of course, be secured with approximate accuracy, but the difficulty in precipitating the casein of human milk and separating it completely from the soluble proteids is vastly greater than in the case of cow's milk, and it is exceedingly probable that this has not as yet been definitely overcome.

To these obstacles is due the great diversity in the published estimates of the relative proportions of casein and soluble proteids, without an exact knowledge of which we are sadly handicapped at the very outset in comparing human milk with that of other mammals. This much, however, may be stated: that at present it seems reasonably probable that neither the fat, the proteids, the salts nor the sugar of human milk are the same as those of cow's milk. The differences in the fats and the salts are generally accepted. A difference in the proteids, and especially of the casein, is forced upon us by our knowledge of the physical reaction with curding agents and the readier digestibility of human casein. For that of the sugar we must accept the chemical authority of others and our own experience—that the sugar of breast milk is much less frequently the cause of disturbance than the lactose of cow's milk. The hope of producing an exact counterpart of human milk from any manipulation of the elements of cow's milk must, therefore, be definitely abandoned. This should not, however, invalidate our conviction that cow's milk offers the best commercially obtainable substitute for the breast.

Practical research in the field of the chemistry of cow's milk has been carried on for many years primarily for the benefit of the dairy interests. Large annual subsidies have been granted and expended for this purpose. Secondarily only, one might say, has it been possible to utilize the knowledge thus acquired for the benefit of those infants who must perforce be fed artificially with

cow's milk. Moreover, physicians have been exceedingly slow in discovering the application to infant feeding of such apparently unrelated subjects as that of the making of cheese. Yet the curding of cow's milk in the human stomach under the influence of rennet-pepsin and acid is a close analogue to the early stages of the ordinary commercial process of cheese-making, and a careful study of the latter explains much which has hitherto been but vaguely understood concerning the digestion of milk. The casein of cow's milk has been to the physician merely casein, whatever the form or combination in which it has been administered as food. Casein, on the other hand, to the advanced dairy chemist is a substance of known chemical composition and properties, capable, like many other substances, of being acted upon by acids, alkalies and ferments, and as the result of such action assuming new properties, forms and combinations which can and should be differentiated from one another in chemical terms.

In the making of cheddar cheese, of which the common yellow cheese is the type, rennet-pepsin is added to the milk and the whole kept in a warm place. The rennet-pepsin changes the calcium-casein into calcium-paracasein, which, in the presence of soluble calcium salts, soon takes the form of a soft, jelly-like clot. Then as lactic acid is formed by bacterial action under the favoring influence of warmth, the acid first unites with the available calcium, forming calcium lactate, and then with the paracasein itself, forming paracasein lactate. With the removal of the calcium the soft clot changes and the formation of a curd begins. This curd of paracasein and paracasein lactate is tougher, more contractile and more ductile. If pressure is now applied to it, the water, milk sugar, salt and soluble proteids separate as whey, carrying with them but a small part of the fat, and the paracasein curd, imprisoning the majority of the fat, may be welded into a firm mass.

This change, then, in the casein of milk is brought about by the agencies of rennet-pepsin, acid, warmth and pressure. All these, and just these, factors, are active during the digestion of milk in the human stomach, with the substitution largely of hydrochloric acid for lactic acid, although the latter may be present in varying amount either in the milk when ingested or when formed in the stomach contents under the favoring influence of warmth.

The rennet-pepsin ferment is active only in an acid medium, and the rapidity of curd formation increases directly with the

amount of acid present. The less the initial acidity, or the more slowly the acidity rises in the stomach, the greater the probability that the clotted and later curded milk will be formed or broken in smaller flocculi as the result of gastric peristalsis. Excessive acidity in the stomach at the time of the ingestion of the milk, such as may arise from the abnormal acids of the fermenting residue of a previous meal, may lead to the rapid curding of milk and the subsequent contraction of the curd in large masses which are difficult or impossible of digestion. Furthermore, the feeble peristalsis of a tired stomach, a condition which often follows upon fermentation and indigestion, is less likely to break up the forming curd and favors the gradual contraction of the paracasein into one or more large masses.

On the other hand, an alkaline medium prevents the action of rennet-pepsin and the formation of paracasein and its compounds until enough acid is present to overcome the alkalinity or antacid values. Upon this principle rests the utility of the various alkalies in infant feeding. This alkalinity may be so great that all, or the larger part, of the milk may escape uncurded through the pylorus into the intestine, or it may only slow the clotting and curding so as to insure flocculent subdivision of the curd, fitting it for readier digestion in the stomach.

In the natural souring of milk, lactic acid is produced from the milk sugar through the agency of one of the commoner forms of bacteria. As the production of this acid progresses the familiar phenomenon of curdling is due to the decalcification of the casein by the acid and the subsequent formation of lactate of casein. This clabber, or casein lactate curd, is soft and jelly-like, and even when its enmeshed fluids are largely driven off by pressure never forms a tough contractile curd. That pure lactate of casein is readily digestible is attested by its successful use under the various guises of buttermilk, zoolak and kumyss, in the production of which lactic acid fermentation is the active factor. The readier digestibility of these forms of casein lactate became easily explicable when it was demonstrated that rennet-pepsin is powerless to change a fully acidified casein into paracasein—in short, cannot transform a soft, friable curd into a tough, rubbery one. That but slightly soured milk, in which the decalcification of the casein has scarcely begun, but in which acid salts are freely present, may form tough paracasein curds with rennet-pepsin, does not, of course, invalidate this principle.

Other acids than lactic acid, and notably hydrochloric acid, may similarly combine with casein; in fact, dilute hydrochloric acid is commercially employed in making a cottage cheese practically indistinguishable from that resulting from lactic souring of milk, although the casein is, of course, in the form of casein hydrochlorid.

It is easily demonstrable that after the addition of sufficient citrate of soda to milk, rennet-pepsin and acid do not form in it tough paracasein curds, but that the curds resulting from the subsequent addition of acid have the same soft friableness as cottage cheese. Decalcification of the casein by its citric acid radical lies, therefore, at the bottom of any successful use of sodium citrate in infant feeding, for, instead of tough paracasein curds, soft hydrochlorid of casein curds, if any, are formed in the infant's stomach. Ignorance of the chemical action of citrate of soda upon milk probably accounts for some of the unfavorable opinions which have been formed, for nothing is more absurd, if it be remembered that sodium citrate makes milk more digestible by decalcifying it, than to expect equally good results when it is added to a milk mixture which has already been fortified with calcium by the routine addition of lime water. The combining power of the citrate of soda is reduced or neutralized and the purpose frustrated by the lime water present, since the formation of paracasein curds may not be prevented.

If we once grasp the all-important fact that it is the toughness, contractility and massiveness of the paracasein curd that makes cow's milk so hard for the young infant to digest, it is not only easy to see that most methods of preparing milk for infants have had as their real end and justification the subdivision of such curds or their partial or total prevention, but it also becomes evident, and is confirmed by clinical experience, that often, just in proportion to our success in limiting the formation of these paracasein curds, the ability of the infant to digest the proteids of cow's milk increases. In short, the difficulty is not with the digestion of "casein" as usually stated, but with the digestion of paracasein compounds. If proof were required of this we have but to consider the rapidly spreading enthusiasm abroad over the results obtained by feeding casein lactate in buttermilk, and the cumulative opinion that by the use of citrate of soda certain infants may readily be brought to digest larger amounts of

casein compounds than has heretofore been deemed generally possible.

Why, then, in this age of scientific phraseology and accuracy, should the underlying principles continue to be ignored? Why should the stress be laid upon buttermilk and citrate of soda and no cognizance be taken of the chemical entities upon the formation of which the successes largely depend? Shall we, then, continue to talk of and teach the student concerning "proteids" and "casein" as though they were always the same thing? Not only do the proteids of milk include soluble proteids as well as casein, but the casein itself is given to the infant in different forms or is often so altered as to undergo different transformations during digestion. In milk to which lime water has been added, or in an acidified milk such as buttermilk, neither proteids nor casein are in the same form as in fresh cow's milk, and to think of them or to speak of them as the same would be scarcely possible in any other field of scientific work.

Let me say here, in parenthesis, that I firmly believe that the reason that the use of buttermilk has not obtained greater vogue in the United States is because of the clearer perception by pediatric men in this country of the essential relation of the proper percentages of fats and proteids, not only to the age of the infant, but to the state of its digestion. I also believe that many of the expedients which alter the chemical composition of casein become less necessary in normal cases in proportion to the degree to which one learns not to exceed in the quantity of the feedings the amount which the digestive secretions of the individual stomach are capable of digesting—not partially and imperfectly, but thoroughly. Nevertheless the value of these measures in disturbed conditions is very great and should be developed and taught the student in such a way that he may understand the indications and use them intelligently when required.

It is of the deepest import for the future of artificial feeding that a new departure should be made. The subject must be clarified. So long as different authorities employ a different nomenclature for the component parts of milk, so long as students are taught to use certain combinations of milk elements much as they might use a proprietary medicine or a proprietary food in the hope that it may hit the mark, just so long will the subject remain to them vague and confused. The present stage of infant feeding may be well compared with that era of medicine,

when drugs were given empirically for certain diseased conditions of the body with little or no knowledge of their physiological action. The attitude of the present-day practitioner toward infant feeding is simply that if one mixture does not suit he must try another. He has no clear perception of the physiological action of the mixture he abandons nor of the physiological indications for the use of the substitute. He may have read that colic and curds call for a reduction of the proteids, and that vomiting points to too high fat. When difficulties arise a trial is therefore made of a new mixture, which is poured in at one end of the infant's digestive tract, to be submitted to the mysterious alchemy of complex and dimly outlined digestive processes, and the outcome is anxiously awaited at the other end to spell success or failure. This is, I think, scarcely an overdrawn picture of infant feeding as it is practiced even by men who read widely and are fairly informed on the subject. The few rules which are laid down for their guidance are based chiefly upon clinical experience and are often contradictory.

Many men, it is true, have learned, or may learn, to feed a certain proportion of infants more successfully by the empirical use of formulæ which have been tested and found suitable for the average normal infant and the average sick infant. They may, by hard experience, learn to adapt these formulæ still further in certain cases, but it is, nevertheless, empiricism, and such knowledge is not easily imparted to others. No one would deny that many infants are unquestionably saved today by these methods who would formerly have died of malnutrition. But infant feeding cannot reach its highest development until we can make it clear to the physician, however remotely located, how he may readily determine by the study of the environment, symptoms and stools of the infant why one mixture has been unsuccessful and by what measures he may remedy the difficulty. To this end an understanding of the physiological and pathological digestion of the elements of cow's milk is indispensable. The way to this has thus far been merely outlined. Much labor and research must still be expended upon it. Only by the solution of these problems can infant feeding cease to be empirical and take its place as a science in the true modern sense. For science presupposes the knowledge, comprehension and understanding of facts and principles.

CANE SUGAR IN ITS RELATION TO SOME OF THE DISEASES OF CHILDREN.*

BY CHARLES GILMORE KERLEY, M.D.,
New York City.

This study was undertaken as the result of an impression that the writer had received from observations on a great many children, to the effect that the use of cane sugar is not without harm to many. Careful history taking as regards inherited tendencies and habits of life with resulting observations while under management has evolved a class of cases which I have termed "the sugar susceptibles." In order to define a "sugar susceptible," I would state that he is usually a child of rheumatic or gouty ancestry, and while the ailments from which the individual "susceptible" may suffer may be various, there is one characteristic peculiar to all, namely, a tendency to recurrence and in a lesser degree to chronicity. Among the "sugar susceptibles" I have included those who had recurrent or persistent head colds, recurrent or persistent bronchitis, recurrent bronchial asthma, recurrent vomiting, recurrent urticaria, rheumatism, chorea and eczema. Seventy-eight cases, aged from eighteen months to ten years, comprise the study. Nine were under three years. Fifteen were among my own patients whom I had cared for from infancy. The remainder, 63, came to me because of the illness which I attribute to sugar susceptibility. Blood examinations were taken in all and none showed changes other than a secondary anemia. Of course, when such a condition was present, it received additional treatment besides that which will be referred to later.

The 78 cases divide themselves as follows:—

Recurrent vomiting	8
Eczema	13
Asthmatic bronchitis	7
Asthma	4
Frequent colds, coryza and tonsillitis	17
Chorea	11
Rheumatism	4
Rheumatism and endocarditis	6
Urticaria	2
Recurrent bronchitis	6

* Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 7, 1907.

In several there was a complication with one or more of the other ailments of the group.

In 1 there was eczema, urticaria and rheumatism.

In 1, eczema, urticaria and bronchial asthma.

In 1, eczema and chorea.

In 1, eczema and bronchitis.

In 1, rheumatism and asthmatic bronchitis.

After the second year, cane sugar in excess of $1\frac{1}{2}$ ounces daily is the rule in an immense majority of children. This can be readily understood from the following reasons: The craving for sweets, peculiar to child life, the tendency on the part of parents to spoil and indulge children, the fact that sugar is used so extensively as a means of flavoring many foods and drinks, the putting of sugar on the market in tons, colored and flavored so as to make it more attractive, the cheapness and the ease with which sugar preparations may be procured, and the fact that sugar eating is a habit readily acquired, all make it very easy for sugar excess to be the rule.

In these 78 cases there was either sugar excess or sugar incapacity. In the majority there was sugar incapacity. The method of management carried out was as follows: When a child was presented for treatment for one of the above mentioned chronic diseases, cane sugar was absolutely excluded from the diet, a small quantity of saccharin being used in stewed fruit and sometimes in puddings and ice-cream. It was found that patients very soon adapted themselves to the absence of sugar from the food, particularly from cereals, if they were well salted. In stewed fruits a small quantity of saccharin was allowed.

In no way was the proper nutrition of the patient interfered with by the absence of sugar.

No attention was paid to the ingestion of carbohydrates other than sugar. It would seem that the organism in these cases does not convert more starch than it requires. In those who suffered from rheumatism, in the recurrent vomiting cases and in asthmatic bronchitis, in the severe eczemas and among those who had true asthma, which it will be seen comprise the majority of the cases, what might be known as interrupted medication was used. For five days they received bicarbonate of soda, from 20 to 30 grains in twenty-four hours. For five days the soda was discontinued

and aspirin or salicylate of soda was given in dosage of from 10 to 20 grains daily for five days, at the end of which the bicarbonate was resumed. Thus the soda and the salicylate medication was given continuously for weeks in some cases.

The most satisfactory results accomplished were in the catarrhal affections of the upper respiratory tract and are included under recurrent bronchitis, asthmatic bronchitis, coryza, common colds and tonsillitis. An absence of free sugar from the diet in the coryza and persistent cold cases effectually broke up the tendency. In 10 of these, the adenoids and tonsils had been removed and the colds persisted. Three had repeated otitis, secondary to involvement of the upper respiratory tract. In 6, adenoids or enlarged tonsils were not and had not been present, although every physician who had seen the cases had looked for them. Two of these children, sons of a physician, are of special interest. They had persistent colds, and repeated otitis with paracentesis for over two years. Both cases were permanently relieved by an absence of cane sugar from the diet with no other treatment or change in method of management.

In but 3 of the above was it necessary to give the interrupted medication. Four of the 6 simple recurrent bronchitis cases passed through the winter without an attack. The 5th had one attack and of the 6th I have no means of knowing accurately. Among the asthmatic bronchitis cases, 7 in all, 4 had one attack each and 3 no attacks, when previously there had been from four to six attacks during the cold months. Of true asthma, 1 child, a six-year-old girl, had one attack during the past winter. A ten-year-old boy passed through the first winter in seven without an attack. In previous years he had had one about every six weeks. The 3d case was not influenced in the slightest degree. The 4th case showed decided improvement, but had two attacks during the past winter.

Eight cases of recurrent vomiting were treated by the non-sugar method and internal medication as mentioned above. In 1, who was having attacks at three weeks' intervals, there has been no attacks in one year. A boy, five years of age, who was having attacks at six weeks' intervals, has had none since May of last year. A girl of four years, who had had seizures every three months, has had none in fourteen months. A boy who had had attacks, three and four yearly for two years, had no attacks in one year. A girl, six years of age, who had one mild attack every

month for three years, continued to have an attack every month in spite of the non-sugar diet and interval medication, it being in no way influenced by the treatment. A boy, four years of age, passed from under observation, and I have no means of knowing the result. He probably did not improve. A boy, five years of age, who had four very severe attacks at from six weeks to three months' intervals, has not had an attack in fifteen months.

Of the rheumatism cases, 10 were treated. Six had had endocarditis. One boy, nine years of age, developed a recurrence of the endocarditis while under treatment. The others have thus far been free from six to eighteen months.

The eczema cases make an interesting group. They are 11 in number, and all were pronounced cases, all came because of the eczema and all had been treated, most of them by dermatologists who had paid a great deal of attention to the skin and very little to anything else. Nine have been permanently relieved up to the present time. Those treated within six months are not included. In 1 there was no improvement. In a boy nine years of age the improvement was marked at the beginning of the treatment, but the dietetic management failed to be carried out and the results were negative. Two cases of persistent urticaria have been relieved, 1 for eighteen months and 1 for ten months. One of these cases is of special interest. So sensitive is he to the sugar poisoning that one small piece of candy is sufficient for a mild outbreak; this has been shown on two occasions.

Eleven were cases of chorea. In these the results of the acute condition, so far as an absence of sugar was concerned, were negative. Sugar was eliminated from the diet, but that the patient showed any more rapid improvement than those treated otherwise, I am not prepared to state. Three developed a recurrence while on the non-sugar and interval treatment, but the seizure was much less severe than the previous one. Examination of the urine was repeatedly made in all of these 78 cases either by Dr. Frederic Sondern or my associate, Dr. Royal S. Haynes, before and after instituting treatment, but this failed to throw any light on the cases.

While the above cases were under treatment it was interesting to note the sugar capacity of well children. It was demonstrated that the sugar capacity varies greatly. In some children large amounts, 3 to 4 ounces a day, could be taken without harm,

while in others a few grains would produce signs of sugar poisoning.

It would seem that to some individuals cane sugar is sufficiently toxic to produce a perversion of function with symptoms of its own, as in cyclic vomiting, and in others to produce enough change to invite or allow bacterial invasion, as in acute articular rheumatism and endocarditis.

DISCUSSION OF PAPERS BY DRS. DUNN, SOUTHWORTH AND KERLEY.

DR. ROTCH.—I think that Dr. Southworth is working along the right lines. It is very important that investigations of this kind be carried on in order to put the subject of percentage feeding on a proper basis. The paper is a most excellent one.

DR. FREEMAN.—I think this paper by Dr. Dunn very important, because it calls attention to the value of whey in infant feeding. The use of whey has been neglected, although it is one of our most valuable aids in difficult cases. This has been largely because of the neglect of physicians to use the laboratories. It can be easily ordered from the laboratories, while its preparation at home is very uncertain, the purity of the whey depending on the amount of pressure used in separating it from the curd. The whey proteids as obtained from the laboratory are a constant quantity. The value of whey in increasing weight has been well demonstrated by the charts, but another thing that whey will often do is to relieve instantly a severe colic.

As to the use of cane sugar, last year we had a number of babies in the first year of life on milk sugar and a number on cane sugar, and we found that most of those on cane sugar did just as well, but some of them had to be changed back in order to thrive. So far as the elimination of sugar from the diet in older children is concerned, the most important thing is to keep it from the cereals. Dr. Kerley's paper emphasizes one thing of value—that these colds in children are due to indigestion and are not produced by exposure to cold.

DR. HOLT.—I have been following the plan of the routine use of whey mixture for very young infants, and have been surprised to see to how great a degree our *bête noire*, chronic constipation, has disappeared. I believe that the rational thing with young infants is to use the divided proteids from the beginning. In this way we are able to raise the total proteids more rapidly and keep the fats moderately low, with the result of less colic, flatulence, constipation and other troublesome symptoms. I agree with Dr. Freeman that we should use the laboratories

more, and those who do so, and see the advantages of whey mixtures, will soon appreciate their value. I have recently seen a number of cases in which children who, while taking the usual modifications, were habitually uncomfortable, and whose stools contained mucus, and whose weight was stationary, showed immediate and most striking improvement by an elimination of the 1 or 2 per cent. of casein which the formula had contained, and the substitution of the divided proteids.

I was much interested in the point brought out in Dr. Kerley's paper. We have to combat continually the notion of the laity that children require a certain amount of sweets and that this appetite must be gratified. We constantly see the injurious effects of these ideas when put in practice. It is my own custom to specify very carefully the amount of sugar which children are allowed on their cereals and other food, and I find that if the quantity of salt with the cereal is considerably increased they are usually satisfied if the sugar is reduced to a maximum of a quarter or a half teaspoonful, where previously they had taken four or five times as much.

DR. KERLEY.—I have used the whey feeding quite extensively for two years—in some the whey from the laboratory, and in others whey made at home. My feeling is that it is a very useful measure and is applicable in a considerable number of cases, but that it is by no means the solution of the infant-feeding problem; far from it. I have had successes and have had signal failures. I have found it particularly useful in the premature and in the congenitally weak children. Its chief fault is, perhaps, that children do not gain on it particularly well; growth does not follow oftentimes as it should; the infants are quite apt to remain at a standstill. I do not think it is a measure that can always be relied upon.

DR. GRIFFITH.—I would call attention to the fact that we seem to be forgetting the studies of recent years which indicate the difficulty the human organism has in absorbing foreign albumins. Not only do the casein bodies and fat, respectively, differ in chemical composition in cow's milk and in human milk, but probably the whey proteids as well. A recent German investigator found that, whereas the infants on whom he experimented digested well the proteids of the casein group from cow's milk mixed with the whey from human milk, indigestion was produced by mixing the casein proteids of human milk with the bovine whey. This seems to indicate that it is the whey proteids of cow's milk and not the casein group which produce indigestion in infants. Pfaundler has recently written a very interesting review of this matter, emphasizing the fact to which I just alluded, that there is no element of cow's milk which is incapable of producing difficulty of digestion in the child. He solves the problem by giving the infants breast milk when he can.

That is, of course, what we all try to do—when we can. It seems undeniable that there are certain principles in mother's milk which seem necessary in the digestive process of many children. This is the reason why some infants will thrive on mixed feeding. They receive in this way the special bodies of human milk, whatever they may be, and are rendered able to digest the cow's milk which forms the greater part of their feeding.

DR. CHURCHILL.—These papers are very interesting as emphasizing the trend of modern methods of infant feeding toward the recognition of different forms of indigestion. The advocates of the percentage methods try to determine from what form of indigestion the child is suffering and then feed accordingly; one sees that constantly in all the literature on the subject. I do not see how anyone who has used the "split proteids," or the whey mixtures, can help being an enthusiastic believer in these, because, if one follows up his cases long enough, in the vast majority of cases the babies will invariably do well. We can start off on pure whey and then build up the other ingredients until we have the children on a nutritious mixture. We do not expect them to gain on the pure whey. The other ingredients which they need must be gradually added. Whey is so simple that few babies can fail to digest it. The great difficulty with most of the profession is that they are too indifferent to study the matter and they fail to realize how much good can be accomplished.

DR. CARR.—From my own experience I would accept Dr. Kerley's statement, in referring to Dr. Dunn's paper, that whey has a decided place in the feeding of premature infants and congenitally weak children where the mother's milk is shown by analysis to be low in proteids, but after using the whey for a time it seems almost impossible to have a steady gain in weight. To continue to use whey alone, where there is not a gain in weight, is a great mistake, for an added amount of proteids and fat is required.

With reference to Dr. Kerley's paper on the use of sugar, I think we have all been struck with the fact that children with a so-called rheumatic or uric acid diathesis (using that term in the broadest sense) are found to be "catarrhal" in a large number of cases, and whether or not this is due to faulty sugar digestion, or faulty oxidation, is a question. We know that if we can get these children out in the air they will do very well with the same amount of sugar. In eliminating the sugar from the diet, we must bear in mind that this matter of faulty oxidation is to be regarded as one of the features in the condition.

DR. EATON.—Dr. Dunn has said that the failure of modified-milk feeding must be due to the limitation of our resources, or to their improper employment. Given a known supply and known

value of the ingredients and an appreciation of the known proteid contents, the factors remaining are the personal equation of the physician and the individuality of the infant. In my part of the country infant feeding is a byword because the individual patient is not taken into consideration. Physicians are apt to take a set of tables and feed the babies according to them. I have for the last year or two been using the whey mixtures with great satisfaction, and I find that while I use the laboratory as much as before, there are cases where, from prejudice, or inability to pay the charges, homemade whey has to be used and does very well. We can get approximately good results in this way.

DR. SAUNDERS.—I have used the whey proteids for many years and with great satisfaction. As Dr. Kerley has said, it is not a complete solution of the problem; nor is any other method. But, I think, it has given me more satisfaction than anything else. Dr. Kerley speaks of infants not gaining; one of the mixtures with which I have had most rapid gain is a mixture of whey and condensed milk. Some babies will assimilate condensed milk who will not assimilate any laboratory mixture. In atrophic children, and in cases of persistent vomiting, the whey mixture alone will not suffice, while the addition of condensed milk will often bring about rapid gain. Of course, unless the rennin has been killed by heat, you get precipitation of casein. In that case it is given cool, because, when warm, precipitation occurs.

In reference to the restriction of diet of children with eczema, I have found that in cases nursed at the breast of mothers who lived on highly seasoned food there is often eczema due to this cause. In one case of twins I found that, by withdrawing all pepper and spices from the diet of the mother, the babies got well. In considering this whole question we should discriminate between what is toxic and what is indigestible. There are babies to whom various articles of food are toxic. Some babies get poisoned almost unto death by egg albumin; I have seen this idiosyncrasy so marked that a baby would have erythema about the lips as soon as the albumin of egg touched them. We must look out for the consequences of alien foods. There are different elements of food that are violently toxic to certain babies with food idiosyncrasy.

DR. CRANDALL.—After watching these cases for a long time my experience bears out what Dr. Kerley has said. One point that struck me as of particular interest is this factor of individual idiosyncrasy with regard to sugar. There is none of the other elements of diet against which there are so many cases of intolerance. Because the great majority of children can take sugar with impunity, it does not follow that all can do so. That is a point which the paper brings out to our advantage.

DR. DUNN.—I would relate a little incident which illustrates that success depends upon the ferreting out of particular

digestive peculiarities. A baby in the Children's Hospital had a diagnosis of infantile atrophy, and I was very anxious to make the baby gain weight. I tried everything I could think of; finally, I decided to try condensed milk. We gave the "Eagle" brand of condensed milk, and the baby immediately began to gain weight with great rapidity. I felt very proud of the case, and showed the baby to Dr. Rotch, but he was not enthusiastic at all and declared the case could be dealt with just as well with the resources of milk modification. He asked me what was the composition of condensed milk, which I happened to be able to give him, and he said: "Well, sit down and write such a prescription for the laboratory." I did so, and on that modification from the laboratory the baby gained weight faster than it had before. Now, it would have been easy to have attributed that gain to condensed milk, when, as a matter of fact, our proper resources had not been exhausted at all. In those cases where there is an intolerance to cow's milk albumin, by giving the whey proteids and caseinogen separately you find out where the intolerance is.

DR. SOUTHWORTH.—I should like to add my testimony to the value of the split proteid method; I have had excellent results with it in newborn and premature infants.

In regard to the intolerance of sugar, the argument is frequently brought to me by mothers that we employ sugar in the artificial feeding of children in the first year, and why not allow it in the second? We are, in one sense, training them to give sugar when we add it to the artificial feedings, and it becomes necessary for us to point out to them that when the child can digest starches these are transformed into a sugar of a less cloying and disturbing type.

DR. KERLEY.—The children sometimes do gain on the whey mixtures, but the point I make is that they will not continue to gain, and that it is necessary to increase the proteid gradually, which, in many cases, I have not been able to do.

Infections in the Newborn. — Salge discusses (*Berlin. Klin. Woch.*, March 5, 1906) the common infections arising through the umbilical cord, and thinks these can be well treated by local applications of alcohol. Nursing at the breast is one of the most efficacious means of overcoming infections at this early age. The author is opposed to washing the mouths of nurslings because the epithelium is apt to become denuded, and secondary infections arise. He speaks of colds in infants as fostering infections, and advises their treatment with the suprarenal preparations. In wrongly-fed or poorly-fed children, especially those whose skin is not properly attended to, furunculosis is likely to develop. Astringent solutions (tannic acid or potassium permanganate) are advised for these.—*New York Medical Journal*.

CHRONIC CERVICAL ADENITIS.

BY J. THOMPSON SCHELL, M.D.,
Philadelphia, Pa.

When a child is brought to me with enlarged cervical glands I admit that I am often in a quandary as to the proper diagnosis, prognosis and treatment. The whole subject is a debatable one, and there is still a wide diversity of opinion as to the proper diagnosis and treatment of cervical-gland disease.

Diagnosis.—To begin with, it is well to realize that a positive diagnosis cannot be made without a microscopical or a bacteriological examination, as in the beginning stage tubercular adenitis does not differ clinically from simple hyperplastic enlargements.

Age.—This is of considerable value in a diagnostic way, as prior to the third year tubercular lymphadenitis is comparatively unknown, and cervical-gland enlargement prior to this period can usually be considered as simple hyperplasia, non-tubercular in character.

From the third to the twelfth year, however, a great number of cases of enlarged cervical glands are seen and are considered by many authorities as tubercular in quite a considerable percentage. On the other hand, Laser found only 137 children out of 1,216 examined by him to be free of glandular enlargement, and expressed doubt as to tubercular infection except in a very small percentage of them. Vallandt examined 2,506 children and found 96 per cent. of those between seven and nine years, and 71 per cent. of those between ten and twelve years, showed cervical-gland enlargement. How many of these were simple chronic adenitis and how many were tubercular it is impossible to say, but he expressed the opinion that only a very small percentage could be diagnosed as tubercular, and judging from the subsequent course they were in the main of a non-tubercular type.

Social Condition.—The environment of the patient has an undoubted influence on the production of tubercular adenitis, and therefore a study of these environments will oftentimes prove of great value from a diagnostic standpoint. While this disease affects children in all conditions of life it is much more prevalent

among the poorer classes, who are not receiving the proper kind and amount of food.

If a child is living in the home of a patient known to be ill with phthisis pulmonalis, and exhibits cervical-gland enlargement, we would, of course, have a strong presumptive evidence of a tubercular infection.

The frequency with which tubercular adenitis follows simple hyperplasia, so often noticed as the result of an infection during the various diseases of childhood, such as scarlet fever, diphtheria, measles, etc., would seem to suggest that any chronic irritation of the lymphatic glands predisposes to a later tubercular infection, and a history of repeated attacks of acute adenitis, with later a progressive enlargement, is certainly suggestive of this condition.

The point of entrance of the infection is most frequently through the upper respiratory canal, and, therefore, any chronic enlargement of the tonsil or adenoids may suggest the possibility of tubercular infection, especially if on removal of this tissue a microscopical or bacteriological examination reveals the presence of the tubercle bacillus.

In this connection it is interesting to note that Diculafoy injected 61 guinea pigs with bits of hypertrophied tonsil and produced tuberculosis in 8 cases.

A careful examination of the mouth and pharynx should, therefore, always be made, as from this routine examination much may be learned that will at least be suggestive.

Carious teeth are believed to be a frequent mode of infection, as the tubercle bacillus is almost always present in the carious teeth of tubercular patients, and as carious teeth are so frequent in children an examination that reveals a mouth well filled with teeth in various stages of decay again suggests a possibility of tubercular infection.

Scrofulous glands do not exist, strictly speaking, and the term "scrofulous diathesis" means merely an anomaly of the constitution in children manifested by a tendency to a chronic, non-specific inflammation of the skin and mucous membranes, with secondary enlargement of the glands of the neck; but no doubt this condition constitutes a medium most suited to the development of tubercular infection, and, therefore, when noted prior to a progressive cervical enlargement would be of value in a diagnostic way.

The clinical course and appearance of tubercular adenitis vary greatly. The disease is usually bilateral, and, while the course is slow, varying from a few months to three to four years, and in a sense is progressive, there occur intermissions in its progress with apparent resolution and with subsequent outbursts of new activity, which often are dependent on some acute infection following influenza, whooping-cough, etc., but at other times due simply to an apparently lessened resistance, the result of the state of the general health. It is this irregular course and slow progression that makes a positive, or even fairly probable, diagnosis difficult, if not impossible, to make.

The clinical appearances of tubercular adenitis vary according to the stage of development. The stages are briefly as follows: (1) Simple hyperplasia; (2) hyperplasia with tubercles; (3) caseation; (4) extension to surrounding tissue; (5) involvement of the skin; (6) sinus formation.

In addition to this, many cases show a mixed infection, which again alters the clinical appearances, not only of the mass, but also of the character of the discharge from the same.

It is apparent, therefore, that no one definite, clear-cut symptom exists upon which a diagnosis of tubercular infection can be made.

Treatment.—The question of treatment resolves itself into: medical, surgical, or a combination of both.

The medical treatment consists of a carefully outlined and rigidly enforced antitubercular treatment as understood today, including plenty of sunlight, open air, forced feeding, care of the digestion, placing the oral and buccal cavities in as perfect a condition as possible by the removal or filling of all carious teeth, the removal of adenoids and enlarged tonsils, the usual hygienic methods of ventilation, the daily bath, the regulation of the bowels, and all the various details so much talked of and so well understood in this day of the successful treatment of tuberculosis.

According to Holt, tuberculosis of the external lymph nodes is seldom, if ever, the direct cause of death, and if treated medicinally will, while the course is oftentimes slow and protracted, ultimately be followed by a good recovery; and Treves states that the percentage of those who die from general tuberculosis is so small that this danger cannot be used as an argument in favor of surgical treatment.

Dowl has collected 309 cases treated by the surgical method, and several years after operation 65 per cent. of these were apparently cured, 18 per cent. were living, though suffering from either local or general tuberculosis, and 16 per cent. died of tuberculosis.

Von Bergmann states that pyogenic cocci may cause a localized abscess, which will obliterate the tubercular gland tissue and a spontaneous recovery follow. This fact may or may not be utilized later in the treatment of this condition.

A matter of great importance, especially in girls, is the cicatrices that form following the breaking down of the glands, and which is supposed to be more marked following the medical than the surgical treatment. A better name for those cases where large scars are allowed to form would be the "neglected cases"; for when the glands begin to show evidence of distinct softening the surgeon is surely to be consulted and his advice followed—surgeon, I mean, in all that the title should stand for. I have always believed that anyone with training and perseverance could develop into an operator, but a surgeon is one who not only knows how and when to operate, but, more important, knows when *not* to operate, and in the class of cases under discussion he has a most difficult decision before him.

No local treatment, as a rule, is indicated, and in the majority of cases it is positively harmful.

Internally, cod-liver oil and syrup of the iodid of iron in large doses seem to have a good effect, but it is not to be overlooked that many of the preparations of the syrup of the iodid of iron as dispensed are almost inert.

The X-ray treatment has, in some of my cases, proven to be of a decided benefit.

The surgical treatment of this troublesome affection could be divided into the "radical" and "conservative" methods.

The "radical" is directed toward an attempt to remove all of the chains of enlarged glands, no particular attention being paid to the resultant scars. This method of late has been growing in favor, but I fear on insufficient foundation, as the statistics just quoted, and many others, certainly do not seem to justify such radical measures. No less a surgeon than Dr. Treves says: "The surgeon who commences to remove a large collection of tubercular masses in the neck is setting forth on no

light undertaking, and must remain uncertain as to the direction in which he will be led and as to the limits which he may reach." Also, scarcely an instance can be cited in the range of operative surgery where a knowledge of structural relations is more essential, or where the landmarks are more distorted.

Inasmuch as it is next to impossible to remove all of the diseased glands—and in the attempts at this almost impossible feat the patient is more than likely to be reinfected all along the line of dissection—the complete radical operation has not appealed to me as a wise surgical procedure. Some surgeons argue that these enlarged glands should be removed before adhesion to surrounding tissue has taken place, and surely before caseous degeneration; but who is to decide that these comparatively small, freely-movable glands are going on to caseous degeneration, or to spontaneous resolution?

It seems to me that the radical operation has a limited field of usefulness. When a gland shows a distinct softening it should be excised, curetted, and packed with iodoform gauze.

This conservative method combined with the use of the X-ray, and good medical and hygienic treatment, will give in a large majority of cases very satisfactory results with very insignificant scar formation.

Diphtheritic Stenosis of the Larynx.—Moltschanoff analyzes (*Roussky Vrach*, January 7, 1906) the material at the Infant Hospital at Moscow during the past ten years, with reference to the rôle of intubation in the treatment of diphtheritic stenosis in infants. The results of the treatment in the hospital mentioned showed a mortality after intubation of 52.4 per cent., a figure lower than those reported by a number of other European clinicians, ranging from 76 per cent. (Klein) down to 56.5 per cent. (Thumer). Moltschanoff's object was to show the advantage of intubation in diphtheria in early infancy. The chief argument of the opponents of intubation in early infancy is that the larynx is so narrow and small that intubation is very difficult. He met in his ten years' experience in the hospital only three such cases: One was in an infant of eight weeks, on account of the small size of the larynx, and the other two were in the shape of edema and of spasmodic contraction, respectively. But in all three patients the intubation was performed. Only in a single instance in which three attempts at intubation were made, a tracheotomy was found necessary on account of the spasm.—*New York Medical Journal*.

Clinical Memoranda.

A FURTHER NOTE ON THE DURATION OF THE PRODROMAL PERIOD IN RÖTHELN.*

BY D. J. M. MILLER, M.D.,
Philadelphia, Pa.

Two years ago† I reported 3 cases of Rötheln, in which I had been able to note accurately the exact length of the prodromal period. In 2 of these cases this period lasted exactly three days. In the 3d case, distinct, although slight, prodromal symptoms continued for five days before the eruption appeared early on the sixth day. In all of the cases the symptoms of the initial stage were well defined, although of slight degree, and might easily have escaped detection had the patients not been constantly under the eye of an intelligent and trained observer. In my previous note I expressed the belief that the prodromata (or prodromes) of Rötheln are seldom accurately determined or are believed to be non-existent, because physicians rarely have the opportunity personally to observe patients during this period, but must rely upon the statements of mothers or nurses; and that this belief was, with other things, based upon the fact that, among many instances of Rötheln observed by the writer, in the only cases in which it had been possible to fix definitely the prodromal period, this period was of longer duration than is usually attributed to this exanthem.

I now add 2 more cases of mild Rötheln, in which the prodromal symptoms were distinct, although slight, and of more definite and prolonged duration than is considered frequent in rubella. The first patient was an intelligent waiting maid, twenty-two years old, who had passed through both scarlet fever and measles; the latter very severely at the age of twelve. During the night of May 8, 1906, she began to have headache, backache and undefined sensations of fatigue in the leg muscles. With these there was the merest trace of conjunctival congestion, but no actual catarrhal symptoms. These symptoms, which were not severe enough to interfere with the performance of ordinary duties, or to cause the patient to seek relief, continued until the night of May 10th, when a friend commented upon the extreme redness of her face. This led to a request that I see the patient, which I

* Read before the Philadelphia Pediatric Society, March 12, 1907.

† Archives of Pediatrics, January, 1905.

did about 11 P.M. I found the face, chest and arms covered with a measles-like eruption, a slightly reddened pharynx, congestion of the conjunctivæ, no cough or coryza, swelling and tenderness of the postauricular glands (noticed by the patient that morning), a temperature of 99.5° and pulse of 70. The eruption and subsequent course were characteristic of Rötheln, the patient quickly regaining her usual health. The initial symptoms in this patient were slight, but unmistakable, lasting exactly forty-eight hours, the eruption appearing at the close of the second, or beginning of the third, day. The 2d case, a male, aged about thirty-six, who had measles and scarlet fever in his youth, early on September 8th began to have headache, backache, muscular fatigue, slight sore throat and a temperature varying between 99.5° and 100° . These symptoms continued, although the patient was up and about, thinking he had a slight cold, until the night of the third day (September 10th), when his wife noticed an unusual flush on his face during sleep. The next morning (September 11th) I found the face, chest and upper arms covered with a scarlatiniform eruption composed of small puncta and macules so closely placed as to bear a close resemblance to scarlet fever. There was no coryza, slight pharyngitis, no enlargement of the postcervical glands, and the temperature was 99.6° . In three days the rash subsided and was not followed by desquamation. Because of an extensive epidemic of Rötheln prevalent at the time, and because of the prolonged prodromata, I regarded the case as one of Rötheln. In this patient the initial symptoms lasted about three days, the rash appearing at the beginning of the fourth day. What is the import of these cases, and why has it been thought worth while to present them for your consideration? I have done so for a twofold reason: First, as a matter of scientific interest and accuracy; and second, because if a distinct and prolonged prodromal period is of not infrequent occurrence in Rötheln (often overlooked from the mildness of the symptoms, or because the patients have been too young to describe their sensations), it will be a valuable aid in distinguishing the disease (particularly the scarlatiniform type) from mild cases of scarlet fever. None of these cases, be it noted, belonged to that unusual class, described by all writers, wherein the prodromata of Rötheln are severe and prolonged; but were of very mild character, such as might have readily escaped the notice of nurses and mothers, especially when occurring in very young children.

FOUR CASES OF MORE THAN AVERAGE INTEREST IN CHILDREN.

BY ARTHUR WILLARD FAIRBANKS, M.D.,

Instructor in Clinical Medicine, Tufts College; Assistant Physician, Department for Nervous Diseases, Children's Hospital; Visiting Physician to the Floating Hospital for Children; Assistant Physician for Diseases of the Nervous System, Boston City Hospital; Physician to Boston Dispensary, Boston.

A CASE OF AMAUROTIC FAMILY IDIOCY.

I. P., sixteen months old, was brought to me by its mother with the following history:

One older child well. No other pregnancies. Parents deny syphilis. Both normal. Child has never had any convulsions. For about a week in early infancy had a "cold in nose" and a slight rash, which mother thinks was only a "baby rash." She was apparently well up to the seventh or eighth month, recognizing father and mother. She now began to take less notice of things and let her head fall forward on her chest. Gradually stiffness in legs and arms appeared, and after a time she no longer seemed to know the difference between father and mother. Where formerly she would allow only her mother to hold her she now became indifferent. For last few months has held head back all the time and stiffness in the extremities has increased. Now notices a bright light, but little or nothing else. Has never sat up, crept, stood, walked or talked. For last month or two the child has had attacks of rolling up her eyes, with rigid contraction of extremities, lasting a second or two.

Examination.—Expression vacant, but not imbecile, sight present, but intellectual comprehension evidently absent. Pupils equal and react to light, but feebly and slowly. No deviation of axes of eyes, or ptosis. No paralysis in face or elsewhere. All extremities are moved more or less as child lies on its back. On passive movement, inconstant but at times very marked spasm is evident in both upper and lower extremities. At other times the child relaxes considerably, but adductor spasm is never entirely absent. On standing, legs become stiff and tendency to adduction is evident, but when she is held sitting on edge of table the spasm in all extremities becomes very marked, the legs stiffening in rigid extension, the arms abducted, semiflexed and rigid. No retraction of head or cervical rigidity. No tache. Knee-jerks lively. Double Babinski. No clonus. Anterior fontanel $\frac{3}{4}$ in. x

$\frac{3}{4}$ in., depressed. Sutures closed. Pulse irregular in rhythm and force. Respiration and temperature normal. Circumference of head, 46.7 cm. Especially noticeable is the marked hypersensitivity to sound. Even a sharply spoken word causes sudden general convulsive contraction of muscles. A rather curious cough of pharyngeal character is frequent.

A presumptive diagnosis of amaurotic family idiocy was made and the mother told to have the eyes examined. This she had not done when she returned sixteen days later. The child still held head back, but no real rigidity of cervical muscles was present, although she cried, when these muscles were stretched, as if in pain. Pupils equal, moderately dilated, reacting practically not at all. No sight is evident, though mother thinks she sees gas light. No reflex on quick approach to conjunctiva. Palate appears to hang flaccid without movement. Extremities not quite so rigid and then chiefly on passive movement, otherwise hanging quite flaccid. Adductor spasm is the only spasm that cannot be easily overcome. Here separation of thighs to only about 45 degrees is possible, beyond which she cries in pain. Knee-jerks lively. Double Babinski. No clonus or patella twitch. Pulse 80, variable. Temperature and respiration normal. Extremities moved but little. Skin of entire body has lost considerable in elasticity and is wrinkled in places. Child coughs much, in curious succession of little short hacks, many times repeated, but does not become red in face, vomit, or whoop at these times.

The mother did not again return to my office, and I thought I had lost sight of the child forever, until one day, nine months later, it turned up at the Children's Hospital. At this time there was no material change in child's condition. She lay with limbs and body flaccid, taking no notice of anything about her. On examination of the fundus Dr. Spaulding reported a typical ophthalmoscopic picture of amaurotic family idiocy, a cherry-red spot in each macular region. "The surrounding grayish zone is not as large as I have seen it, but it is perfectly distinct. Nerve heads show quite a marked pallor. The whole picture of the baby, it seems to me, is quite typical of this condition."

CEREBROSPINAL MENINGITIS.

M. S., six years. Taken with what was thought a slight catarrhal conjunctivitis or "cold in the eye."

Seen by family physician several days later on account of

vomiting, disinclination to play, inclination to sleep and refusal of food. Continuation of these symptoms with rapid loss of flesh in the next few days alarmed both family and physician.

When seen by me in consultation the child lay in stupor, but was not unconscious, with extreme pallor and emaciation, slightly retracted head, rigid cervical muscles, retracted abdomen, tache, rigidity of extremities, with increased reflexes, Kernig's sign, and marked pain in extremities, and on pressure along nerve trunks in lower extremities. Bowels constipated. Left eyelids swollen, with injected conjunctiva and profuse thin mucopurulent discharge. Five days later a profuse eruption of herpes appeared on left side of neck. Nothing whatever was being done for the eye; but with energetic treatment the infection cleared, and slowly the other signs disappeared. The child made an extremely slow convalescence, it being months before her former flesh and color were regained, although the marked emaciation was a matter of only a few days in onset.

There were other cases of meningitis epidemic at the time, but not so far as I know with eye symptoms.

Koplik mentions a case also of this kind where a meningitis was preceded by a conjunctivitis in the secretion of which the intracellular diplococcus was present. I believe this mode of infection is more common than supposed.

It is also necessary to call attention to the existence of very light cases of meningitis with subacute symptoms, of which I have seen several.

ATAXIA FOLLOWING MEASLES.

D. M., five years. F. H., negative. Two others normal, aged twelve and six years. Both walked at fifteen months. P. H., pregnancy and birth normal. No asphyxia. Sat up at nine months. Crept at twelfth and walked at eighteenth month. Pertussis at one year. When four and a half years old had a severe attack of measles followed two weeks later by an attack of prolonged screaming, in which mother thinks child did not know what she was doing. No spasm.

Since the measles has been unable to walk steadily (six months, since April), staggers and falls readily and is not able to use the right hand as well as the left. Right hand shakes and she spills food. Uses the left hand almost exclusively. Talks clearly and without hesitation.

Examination.—Marked Romberg. Considerable staggering in walking. Pupils equal and react to light. No nystagmus. Speech normal. Strength of right arm and leg good; as good as the left. No spasm. Some incoordination and tremor in grasping with right hand. Right knee-jerk slightly greater than the left, and Babinski reflex present. Plantar reflex normal.

October 22d.—Walks about as above. Romberg still marked. Ataxia does not seem so marked in hand.

November 5th.—Uses hand much better, walks stiffly with right lower extremity, but better than formerly. Knee-jerks about equal.

November 19th.—Walks with feet wide apart and some dragging of right foot. Still considerable incoordination in right upper extremity, but can pick up pin from floor. No tremor. No longer any Romberg and no Babinski can now be obtained. It seems difficult to obtain even the usual plantar reflex. Knee-jerk slightly greater on right. General condition of child excellent.

INTERVERTEBRAL RHEUMATISM.

G. S., eleven years. Eleven months ago was struck in stomach by boy. Did not vomit, but had severe pain and was constipated. One week later St. Vitus' dance came on with rheumatism in all joints. Entered hospital, where he improved, and in ten days was sent home. A week later came back again. During winter was fairly well, but now is "bad again." Can feed himself but cannot button clothes. Limbs twist and twitch.

Examination.—Holds head rigid and complains of pain on either active or passive attempts to rotate or flex same, referred to posterior cervical region, where over the vertebræ he complains of acute tenderness on pressure (but not over muscles). This is also evident, though to much less degree, in dorsal region. Muscles are not tender.

Complains of pain and winces when vertex of skull is pressed downward, but it does not hurt him when he jumps. In both wrists and in metacarpo-phalangeal joints of thumbs and in both knees complains of pain of slight degree. No swelling or redness and no tenderness. Temperature, 101°.

Heart negative, except occasional slight prolongation of first mitral. Choreic movements in upper extremities.

Diagnosis was a question of rheumatism or possible cervical

caries, probably the former. The child was put on salicylates with bed rest, and returned on May 27th, three days later, with no pain whatever. Could flex and rotate head well, except slight limitation in rotation to the left; all other movements perfectly free. Chorea was well marked.

June, 1906, one year after the first attack of chorea, was again affected, twisting and twitching limbs and face, dropping things and speaking thickly.

May, 1906, one year later, another attack came on. Both of these subsequent attacks of chorea were not accompanied by rheumatism. Heart unaffected.

Delayed Chloroform Poisoning.—Telford and Falconer present the results of a clinical study (*The Lancet*, November 17, 1906) of this subject and report 3 cases occurring in children. The occurrence of these cases prompted them to carry out a series of observations on the postanesthetic condition of children. Of 143 patients examined, 17 contained diacetic acid in the urine and 30 showed the presence of acetone. Of the 143 patients, 33 showed some focus of sepsis, and of these 12 proved to have diacetic acid and acetone in the urine. These patients with aciduria appeared otherwise in normal health. The examination for albumin and casts was negative throughout. The anesthetics used were: Chloroform by the open method (38 cases); chloroform by the open method introduced by ethyl chlorid (53 cases); ethyl chlorid alone (18 cases); and ether alone (9 cases). In the series as a whole, the examination of the pulse, temperature, and respirations yielded nothing worthy of note. Of the 118 anesthetized cases, vomiting was seen in 34, and in only 4 of these could it be described as unusual in amount. No case showed either albumin or casts. The results as regards diacetic acid and acetone are worthy of separate mention.

It would appear from these results that (1) chloroform, ether, and ethyl chlorid may produce a temporary aciduria; (2) so far as is shown by the ordinary routine clinical tests this aciduria occurs not invariably but in the vast majority of cases; (3) ethyl chlorid, either when given alone or when used as an introduction to chloroform, does not appear to differ from other anesthetics as regards the postanesthetic aciduria; (4) there is no relation between the duration of the aciduria and the length of time during which the anesthetic is administered; (5) the acid bodies occur frequently in the urine of patients in apparently normal health and general anesthesia appears to have no special prejudicial action in these cases; and (6) the change of diet involved in preparation for a surgical procedure does not appear to produce aciduria.—*Journal of the American Medical Association.*

ARCHIVES OF PEDIATRICS.

OCTOBER, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

ROYAL STORRS HAYNES, PH.B., M.D.,

ASSOCIATE EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

President and Treasurer, E. B. Treat; Secretary, E. C. Treat.

Contributors and Correspondents, see page III.

THE EPIDEMIC OF ANTERIOR POLIOMYELITIS.

New York and its vicinity is at present passing through a considerable epidemic of infantile spinal paralysis, several hundred cases being reported. Although it is yet too early to tabulate many of the results, attention ought to be called to some of the more important observations in order that future conclusions may be as full and as accurate as possible. Previous epidemics have occurred and a few have been carefully studied, but the sum-total of our knowledge is disappointing. As regards even the symptomatology, the text-books are in many respects at variance with the actual present manifestations. Pain and tenderness are in many cases of this epidemic the most distressing symptoms to be met, requiring some form of opium for their control; again, the number of patients in whom there are indications of bulbar irrita-

tion, difficult deglutition, irregular heart action and labored respiration is large; and rigidity of the neck, occipital headache and irregular pupils may suggest cerebrospinal meningitis and confound the diagnosis in some cases.

The question naturally arises, Are we dealing in every case with a lesion of the anterior horns or are some suffering from poli-encephalitis, acute multiple neuritis or a transverse myelitis? It is theoretically possible that in different individuals different parts of the nervous system are being infected by the same toxic agent, living or dead; and it is therefore important that each case should be diagnosed on its own symptoms.

A precise knowledge of the early clinical data in a large number of cases would furnish a groundwork for further investigation in regard to etiology, mode of infection and early diagnosis. At present it is generally acknowledged that a positive diagnosis before the development of paralysis is impossible. Nevertheless, during the prevalence of an epidemic, every severe case of gastro-enteric disturbance, not evidently the result of faulty diet, should be regarded as suspicious. If constipation is a marked symptom, and if there is pain in the limbs and back, the case should be watched carefully. Probably many such cases would not confirm the suspicion, but one success would justify many failures.

Although the pathological findings have been carefully studied and described, the erroneous idea is still prevalent that the disease is due to a degeneration of the ganglion cells of the anterior horn. In reality the disease is an acute inflammatory process primarily of the arteries, sometimes hemorrhagic, and extending into the gray matter. The cell degeneration is secondary to the vascular changes. As the anterior parts of the cord are supplied by an "end" circulation, it is easy to understand why it is more susceptible to thrombic infections and infarcts than the sensory tracts. This, however, does not explain why the process attacks the cord rather than some other part of the body. This brings up the question of etiology, of which almost nothing is known. Several investigators have described cocci in the spinal

fluid, and further studies are being made in various laboratories in this city. Too much must not be expected from such investigation for the reason that the disease process is entirely distinct from the meninges and the intra-dural spaces. It would therefore seem more logical to make blood cultures in cases seen during the acute attack, with the hope of finding the cause of the local endarteritis.

Aside from laboratory findings, various theories of causation have been suggested from the clinical standpoint. The association of poliomyelitis with other diseases has been interpreted as a causal relation, in many cases upon very slender ground. Malaria, dysentery, scarlet fever, cerebrospinal meningitis, pneumonia, have all been mentioned in addition to various forms of "ptomaine poisoning" and "autointoxication." In any case, inquiry will usually elicit a history of a fall or blow at some time previous to the attack, and parents are apt to lay great stress upon this fact. In some instances it is reasonable to suppose that the injury may have produced the inflammation, but, as a rule, this is not true. It must be remembered that there is probably no considerable period of a child's life during which injuries of one kind or another have not occurred. The fact that the disease is more prevalent among boys than among girls favors somewhat the theory of traumatic origin. Cases are seen at times under circumstances that suggest direct transmission, but they are too infrequent to receive much consideration.

Opinions differ also in regard to the cause of the digestive disturbances. Are they primary, or are they reflex? Are we dealing primarily with a disease of the digestive tract and is the cord lesion due to absorption or is the vomiting due to the reflex activity of a "toxin" developed elsewhere? Many of the older clinicians hold the former view, claiming that the symptoms vary in degree only from cases of "ptomaine poisoning." This theory could be more readily accepted if we had to deal with a degenerative process only, but it is doubtful if a true inflammatory process could be produced by "ptomaine" irritation.

In regard to treatment, very little can be said with authority. The bromids give the best symptomatic results in the early stages, but codein is an excellent substitute if there is much gastric irritability. Ergot is quite generally recommended in the text-books, but in a very half-hearted manner. At what time the administration of strychnia should be commenced, and just what its effect may be, is not decided. Some English observers advise large doses hypodermatically— $\frac{1}{16}$ to $\frac{1}{12}$ of a grain. It is probably useful as a general tonic, and certainly helps the heart and respiratory muscles when they are affected. In different cases the residual paralysis and the rapidity of improvement bear such a slight relation to the extent of the initial paralysis that it is impossible to determine accurately the real benefit of any line of treatment. As in all diseases of children, too much care cannot be given to the general nutrition; and fresh air, sunshine and careful attention to the skin are of the utmost importance. As long as the reparative process continues in the cord, local nutrition should be stimulated by massage, manipulation and electricity, properly administered, in order that the regenerating centers may have good muscular tissue to react upon and also that tendon transplantation, if resorted to, may give the best possible results.

LOUIS C. AGER.

The Use of Oil Enemata for Chronic Constipation in Infants.—Wunsch speaks highly (*Deutsche Med. Woch.*, March 15, 1906) of the use of injections of olive oil as a means of securing a cure in cases of obstinate constipation in nursing infants. The causes of the condition are numerous, but frequently, in spite of all possible attention to the mother's diet, the hygiene of the infant's anus, etc., and the application of the customary remedies, including ordinary enemata, suppositories, abdominal massage, laxative drugs, etc., attempts to cure the difficulty are ineffectual. In these cases the use of an enema of olive oil repeated about every other day for a certain length of time may bring about a normal activity of the bowels. In illustration the author describes a case which had baffled all other means of treatment but remained permanently cured after eight injections of olive oil.—*Medical Record*.

THE CHICAGO PEDIATRIC SOCIETY.

JOINT MEETING WITH THE CHICAGO MEDICAL SOCIETY.

Wednesday Evening, February 27, 1907.

J. W. VANDERSLICE, M.D., PRESIDENT.

SYMPOSIUM ON SCARLET FEVER.

ETIOLOGY AND PATHOLOGY.

DR. LUDWIG HEKTOEN discussed these topics.

He referred to the study of the bacteria of the throat and skin in scarlet fever made by Weaver, who called attention to the enormous numbers of streptococci in the throat in this disease and to their gradual disappearance as convalescence progresses. The result of Ruediger's observations shows that streptococcus pyogenes is constantly present in great abundance on the tonsils of patients with scarlet fever before the throat symptoms begin to subside. Streptococcus pyogenes in small numbers was found only in 59 per cent. of 51 normal throats examined, while pneumococci and the large group of organisms (streptococcus irritans) that lies between the streptococcus pyogenes and pneumococcus were found in about equal numbers in the normal and scarlatinal throats.

From the throat, streptococci frequently pass to neighboring structures, and may also reach the circulating blood and cause streptococcemia as well as various internal and articular localizations.

In 100 unselected cases of scarlet fever in which Hektoen examined the blood during life, streptococci developed in the cultures from 12 cases, all of which recovered, although several were very ill. In Jochmann's series of 161 cases streptococci were found in 25, all of which died. In explanation of this difference he pointed out that his cases occurred in a mild epidemic and most of the patients were over ten years of age; whereas Jochmann's cases occurred in a severe epidemic, the patients being under ten and probably not strictly unselected. All observers agree that in fatal scarlatina general streptococcus infection is demonstrable after death in the large majority of cases.

The results of a search for various specific anti-bodies for streptococci, more particularly agglutinins and opsonins, have so far lacked a desired uniformity. For example, Weaver has shown that in scarlet fever agglutinins develop for streptococci, but these are not specific for streptococci obtained from cases of scarlet fever, and like agglutinins form to an equal degree in erysipelas, and even in pneumonia and other infections.

A recent study in the laboratory of the University of Chicago indicates quite definitely that the streptococco-opsonic index is below normal during the acute stages in the majority of cases. As the symptoms subside, the index rises above normal, to which the return may be more or less abrupt. If complicating streptococcus localizations set in, the index remains low until improvement begins. These variations in the streptococco-opsonic index appear to be specific, as they are not associated with corresponding variations in the opsonic index for other bacteria, such as the pneumococcus, staphylococcus and pseudodiphtheria bacillus.

While it is true that many of the phenomena of scarlet fever, such as the angina, fever, leukocytosis, and even the rash, may be explained by the pathogenic powers of the streptococcus pyogenes, there is no analogy in the immunity conferred by scarlet fever, even when mild. There is no evidence that scarlet fever leaves a lasting immunity to streptococci, and it is known that the immunity which results from streptococcus infections in general is not at all marked and only brief in duration.

It is universally believed that the scales of scarlet fever patients are infectious far into convalescence. Raskin obtained streptococci from the skin in 4 cases in 20; Gordon's search yielded no positive result; Weaver found streptococci in skin cultures in 1 case in 15; and Dreyer failed in each of 30 cases.

Medical literature contains numerous instances of preservation of the scarlatinal virus over long periods of time—several years—whereas the longest time that Weaver could cultivate streptococci was ninety days.

In view of the paramount importance of streptococci in the course and outcome of scarlet fever, the chief significance of the scarlatinal virus would seem to lie in its power to open the door to streptococci. Hence the duty of the physician to guard carefully by adequate isolation against the transfer of specially virulent strains from patient to patient.

COURSE, SYMPTOMS AND DIAGNOSIS.

DR. JOHN M. DODSON discussed these topics. He said that Sydenham, who, from observations in the London epidemic of 1661-65, first differentiated scarlatina from measles and christened it *febris scarlatina*, never saw any but the mildest cases, and, devoting barely a page of his "Observations" to its discussion, considered the affection scarcely worthy the name of a disease. A century later, Fothergill identified the *cynanche maligna* (malignant sore throat) of Cullen with scarlatina, and cases were observed, as to-day, in which the virulent infection overwhelmed the patient within twenty-four hours of its onset. Between these extremes all grades of severity are witnessed, so that we may say that few diseases present a greater range of virulence.

All types of scarlatina are characterized by abruptness of onset and the brevity of the prodromes. The period of incubation is short, averaging from two to four days, rarely six or seven.

The period of invasion is very brief for so serious an affection, ranging from twelve to thirty-six hours, rarely beyond forty-eight. The chief prodromes in the usual order of their sequence in children of the most susceptible age—three to ten years—are: vomiting, fever, headache, angina, backache, not infrequently convulsions, especially in the very young (in the adult, a chill), and less uniformly diarrhea. In older children and adults the sequence is more commonly angina, headache, fever and backache.

The vomiting is of the expulsive type, without nausea, and seldom repeated more than once or twice. The occurrence of vomiting, without other cause, especially in the presence of an epidemic, is alone sufficient to arouse a strong suspicion of scarlatina.

The diagnosis of scarlatina when typical is seldom attended with doubt. It is in the very mild attacks on the one hand and the severe fulminant type on the other that the difficulties arise. The rash may be entirely absent in cases at either extreme; or it may be slight and evanescent and thus escape notice. The groins, axilla and loins should be closely scrutinized for the punctate eruption, and the appearance of the throat is especially helpful. Occasionally, the diagnosis must be made without reliance upon the eruption, though the subsequent lamellar desquamation on

hands and feet may confirm an uncertain diagnosis, or the onset of one of the complications, particularly the nephritis, or of the incidence of the disease in other children in the family, may serve to clear the doubt. In the anginal type, cultural methods serve to differentiate the disease from diphtheria, though it is needless to remark that not all streptococcal anginas are scarlatinal.

In measles, the more gradual and prolonged invasion, with coryza, Koplik's spots, the distinctly papular, darker colored eruption appearing first on the face, and the pronounced cough and early bronchitis, serve to distinguish the disease.

Between German measles and mild scarlatina the diagnosis is often difficult, especially in sporadic cases. The mild character of the prodromal symptoms and fever with so extensive an eruption is perhaps the most helpful distinguishing feature, while the longer incubation of twelve to sixteen days, if it can be determined, is distinctive.

The initial rashes of variola are sometimes very confusing and one may not be able to make a diagnosis until the true variolous eruptions appear.

Septic erythemata are, as a rule, darker in color, more patchy, more evanescent, and are unassociated with the peculiar appearances of the mouth, tongue and throat. The temperature curve, moreover, is likely to present the wider daily fluctuations. The drug eruptions, and those attending the injection of the several curative *sera*, as the antidiphtheritic, antistreptococcic and anti-tetanic, may superficially resemble the scarlatinal rash, but the absence of punctæ, their localized distribution and patchy character and short duration, with the absence of throat and mouth symptoms and usually of fever, will generally enable one to distinguish them.

The various skin affections, excepting the rare general erythema, are, as a rule, little likely to be mistaken for scarlatina and need hardly be discussed in this brief summary.

In scarlatina of the malignant type, when the patient is overwhelmed by the poison and succumbs within a few hours, before the skin eruption and the throat symptoms have developed the most acute and experienced observer may sometimes be in doubt, and it is usually the presence in the family or vicinity of cases of the other types of the disease which leads to a diagnosis.

DR. M. P. HATFIELD discussed

ATYPICAL CASES OF SCARLET FEVER.

He had learned to be distrustful of vomiting as a pathognomonic symptom of scarlet fever. Moreover, vomiting is so frequent in children that it is often not reported by the mother or attendant, so no great dependence can be placed on its presence or absence in making a diagnosis of scarlet fever. The temperature curve may vary. A patient may have a temperature that will not exceed 101° or 102° instead of 103° or 105° , which one expects to find in these cases. There is a class in which there is a reversal of the ordinary, namely, the temperature is higher in the morning and drops toward evening. He has had cases of scarlet fever that have come on insidiously with slight malaise, slight indisposition without any notable elevation of temperature. These cases have run a doubtful course and yet been followed by a nephritis of the most discouraging character.

One symptom to which he pins most of his faith is a characteristic angina. If one will look carefully into the throats of the sufferers during the first forty-eight hours, he will find in addition to a papular eruption, a stiffening of the uvula and arch of the palate, with the characteristic color, which looks as though a fine camel's hair brush had been dipped in carmine ink and drawn over the surface. Later, there is a general erythema or streptococcus infection. Nurses attending scarlet fever patients may show a low grade of angina, with headache and backache, without any rash. He had seen this for years among nurses in the Orphan Asylum during epidemics.

In regard to the erythema, there are more variations in this than in any other symptom. The eruption is expected to appear promptly, but in an atypical case it is long delayed; sometimes it may be so slight that the case is called *scarlet fever without a rash*. This is a misnomer, because there is always more or less redness to be found in the armpits and groins. This is said to be due to localized paralysis of the arterioles. One of the most serious variations is the finding of milk-white patches in the midst of unusually red and swollen rash.

As to desquamation, a few years ago he saw a curious case in which there was a sloughing off of a cast of the whole upper lip. Again, one hand, arm or leg will refuse to effloresce. Only

a few weeks ago he saw a patient in whom the eruption did not extend above Ponpart's ligament.

PROPHYLAXIS OF SCARLET FEVER.

DR. H. SPALDING said that in considering preventive measures for scarlet fever it is well to bear in mind that scarlet fever is not so generally infectious as measles or smallpox.

The prophylaxis of scarlet fever consists in separating the sick from the well and destroying all infection emanating from the scarlet fever patient. To accomplish this, all cases should be reported to a responsible health officer. The difficulties of thorough isolation, so great in most homes and so impossible in many, make removal to a contagious disease hospital desirable.

If the patient be treated at home, a warning should be put on the door. The patient should be put in a room apart from the rooms occupied by other members of the family. All doors opening from the patient's room should be covered with sheets kept moistened with a disinfecting solution.

Carpets, curtains, ornaments, and books should be removed, and cats, dogs and other pets excluded. The care of dishes and table utensils and the immediate disinfection of all body and bed linen, as well as of discharges from the nose, throat, bladder and bowels, should be impressed on the attendants.

Physicians should be consistent in their methods of disinfection of person while in attendance on these cases.

Complete isolation should be enforced until all desquamation of the skin is completed and there is entire absence of discharge from the ears, nose, throat, suppurating glands, or inflammation of the kidneys. The time required for scaling will vary from four to eight weeks. Mild cases in which scaling is not noticeable, with absence of the ear, nose, throat, kidneys and glandular complications, should be isolated not less than six weeks. In severe cases, not less than eight weeks should be the period of enforced isolation.

An adequate corps of medical inspectors would do away with the necessity of ever closing the schools on account of an epidemic. By medical inspection, the sick are kept at home, and, during the school hours at least, the well children are not mingling with the sick. Close the schools and there is a lively, restless population of children with nothing to do but to visit each

other and distribute disease. Closing the schools to control an epidemic is an acknowledgment that the profession does not know what to do or that the means for medical inspection are not furnished.

TREATMENT.

DR. A. C. COTTON said the main indications are to support the patient and to aid in the elimination of the toxins.

Thus far, sera in the treatment of scarlet fever have been disappointing. Escherich claims to have reduced the mortality of scarlet fever one-half by Moser's serum, but the opportunity for general testing of this has been limited.

It had been his custom to begin treatment with moderate doses of calomel, followed by a saline. He avoids the use of so-called antipyretic drugs, as they have too pronounced a depressing effect on the heart and circulation.

The stomach should be invaded as rarely as is consistent with the indication by anything which interferes with digestion, absorption or elimination. The most successful results in reducing toxemia, and incidentally temperature, are obtained from the judicious use of hydrotherapy. Many times, from insufficient aid or intelligent nursing, it is unwise to attempt cold bathing. Some children do not endure a cold bath. No method can be arbitrarily recommended, as each case will furnish the indications on which to base the hydrotherapy. A tepid sponge bath will often quiet restlessness and promote sleep.

Irritability of the patient may be reduced by inunctions, which also tend to prevent the spread of infection during the desquamation. Some physicians object to these inunctions, believing they interfere with elimination by the skin. Patients will perspire profusely through a covering of lard or lanolin. Carbolic acid or eucalyptus may be added to allay the itching. The addition of 1 or 2 per cent. of salicylic acid will promote exfoliation during desquamation.

Too much emphasis cannot be laid on the necessity of treating angina in scarlet fever. Aurists condemn the practice of douching and spraying too freely the postnasal space in cases of scarlet fever, on account of the fear of carrying infection along the Eustachian tube to the tympanum, but it seemed to him that a physician may cleanse this space without increasing the danger of aural involvement and with the hope of diminishing that dan-

ger by removing masses, membrane and secretions which adhere and undergo putrefaction.

DR. H. MANNING FISH said that following an epidemic in 1900 in Paris a French physician published a thesis on purulent nasal catarrh following scarlatina, based on a study of 37 cases, 18 of which terminated fatally. Nasal catarrh of itself is not dangerous, but there may follow very serious complications either of the eye, the brain, or by metastasis of other organs. One of the serious ocular complications following scarlatina is optic neuritis, usually attributed to toxemia. As this condition generally appears during convalescence, it may be weeks or months after the child is about and playing. This fact argues against toxemia. If a purulent sinusitis is present, drainage of the sinuses will cause an acute optic neuritis to yield immediately. Treatment should be directed, therefore, toward the sinuses rather than to the eye. Sinus empyema is the source of many cerebral complications, owing to the intimate vascular supply between the cranium, the orbit, and the sinuses.

DR. WILLIAM L. BAUM has looked for cases of Duke's disease during the recent epidemic and in previous ones, but has been unable to find a single instance which answers the description given by Duke.

As to the differential diagnosis of scarlet fever and measles, the leukocyte count is of great importance. In the mildest forms of scarlatina there is a decided leukocytosis which is of extreme importance in the beginning of the disease. Even in the mildest cases of scarlet fever there is enlargement of the epitrochlear glands. In about 80 per cent. of the cases the glands in the groin are enlarged.

The minimum period of isolation should be six weeks, no matter how mild the attack. Infection can be transmitted as late as the fourth week. School inspection should be a permanent feature, and the Council of the Chicago Medical Society should assist the City Health Department in procuring at least 100 inspectors for a certain period every year, said inspectors to be responsible for the work done in their respective districts. Physicians who are lax about quarantine and in raising it too early are culpable, should be vigorously condemned by other members of the profession, and personally he thinks such men ought to be prosecuted for so doing.

DR. H. B. HEMENWAY, of Evanston, referred to the epidemic

of scarlet fever in that city, saying that since the first of last August there had been reported to the Evanston Health Department 223 cases of the disease. He presented a statistical report of the cases, and pointed out what he believed was the source of infection, namely, a certain dairy company that supplied milk for the district.

DR. H. W. CHENEY said that last summer he had the opportunity of seeing a series of cases of scarlet fever treated in Vienna with Moser's serum. The action of this serum begins to manifest itself within from eight to twelve hours after injection. A marked fall in temperature occurs, oftentimes the temperature dropping to normal within twenty-four hours and remaining there. The pulse shows much the same change. The rash, when the injection is given early, either does not develop or fades away more rapidly than usual. Perhaps the most marked change occurring is in the general condition of the patient. The severer symptoms, such as restlessness, delirium and somnolence, usually disappear. The change in the clinical picture is oftentimes more prompt and striking than we notice after the use of diphtheritic serum. The serum has been used in the Children's Hospital in Vienna since 1900. Before 1900 the mortality from scarlet fever at this hospital was 15 per cent., and since 1900 it has averaged less than 9 per cent. The mortality in other hospitals in Vienna, where the serum has not been used, during this period, since 1900, has averaged 13 per cent. The serum has been given now in over 200 cases, and only the severest ones are injected with it.

There are some objections to the serum, such as the enormous dose necessary to be given, from 5 to 6 ounces being administered at one time. The scarcity of the serum is another objection. Moser, Escherich and their co-workers are fully convinced of the value of this serum, and their results lead us to expect that in the near future we will have a serum for scarlet fever which is free from objectionable results and more certain in its effects.

DR. H. G. VAUGHAN, of Oak Park, spoke of the epidemic of scarlet fever in that suburb. He believes that epidemics of this disease can be traced to infected milk. But there have been in the neighborhood of 110 cases of scarlet fever in Oak Park, and although some suspicion arose as to the epidemic being due to infected milk, this suspicion has not been verified after the most careful examinations of dairies, source of supply, etc.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, March 12, 1907.

DAVID L. EDSALL, M.D., PRESIDENT.

DR. S. S. WOODY showed a boy of twelve years with cervical ribs.

TYPHOID FEVER IN INFANTS.

DR. WILLIAM N. BRADLEY reported a case of typhoid fever occurring in an infant of ten months.

J. H., male, Jewish-American, aged ten months. Breast fed from birth. Family history negative save for fact that one brother, aged two and one-half years, was then convalescing from probable typhoid fever. The patient had always been well.

Present illness began January 18, 1907, with indisposition and general malaise. Nothing definite could be found, and it was concluded that the nervous condition of the mother, due to the severe illness of the older child, had altered her breast milk and caused it to disagree with the infant. The next day the child had slight fever, accompanied by gastric disturbance. On the third day a bronchitis developed, the temperature in the morning being 100° F. A diagnosis of bronchitis was then made, typhoid fever still being unsuspected.

On the fifth day the morning temperature was 102° F. and the child was very dull. It was having frequent greenish stools containing mucus and curds. The blood serum on that day gave a positive Widal reaction. There was gurgling in the right iliac fossa, but there was no nose bleed. The pupils were dilated, the tongue furred, with bright-red tip, the edges later becoming dry and brown. The spleen was palpable.

On the eighth and tenth days small crops of typical rose-colored spots appeared on the abdomen and chest, numbering about eight in all.

On the eleventh day the leukocytes numbered 24,000. The bronchitis was moderately severe throughout the course of the disease.

The enteritis in the beginning and during the first week was severe, there being six to eight large movements a day and several smaller ones, probably caused by expulsion of flatus. There was no tympany. The temperature reached its highest point, 104.6° F., on the eighth day, continued around 104° F. until the twelfth day, and after the fourteenth day fell steadily, reaching normal on the seventeenth day. Then, owing probably to infection in the middle ear, remained at 99° F. and 100° F. until the twenty-seventh day, when discharge from the ear occurred and the temperature fell to normal. The respiration and pulse varied with the condition of the child and with the amount of fever, ranging as high as 60 and 160, respectively.

A noticeable fact was that when the temperature was below 102° F. the child would sit up in its cradle, rocking itself and playing, while if the temperature were higher it was drowsy and prostrated.

The nutrition of the child was not materially interfered with. The baby was nursed at the breast regularly every two hours during the day and twice at night. A sponge bath was given for fever above 101 $\frac{2}{5}$ ° F. It received forty-two sponge baths, and these were discontinued after the fifteenth day. Otherwise, the usual treatment was followed.

DR. J. P. CROZER GRIFFITH reported 2 cases of typhoid fever in infants of nine months, one terminating in recovery and the other still ill from the disease. The cases were characterized by development of roseola, enlarged spleen and positive serum reaction.

DR. D. J. MILTON MILLER considered it very important that the profession should recognize the fact that typhoid fever is not uncommon in children under two years of age, and even under one year. He said that unrecognized cases of typhoid fever in infants may be one of the causes of the prevalence of the disease. When a baby has prolonged fever, every recognized method for establishing a diagnosis, even blood cultures, should be used.

DR. D. L. EDSALL agreed with Drs. Griffith and Miller as to the importance of typhoid fever in infants, and thought that those physicians that consider that the disease never occurs in infants speak of matters of which they have no experience. He had seen cases in which intelligent mothers in families in which there has been an epidemic of typhoid neglected to take the precautions

with babies that they take with the other members of the family, because they had heard from professional sources that young children never contract the disease.

DR. EDWIN E. GRAHAM reported a case of

SARCOMA IN A CHILD OF FOUR YEARS.

The patient, C. S., four years of age, with negative family history, was admitted to the Philadelphia Hospital, February 2, 1907, complaining of pain on left side of face.

His personal history showed that two months before admittance he had suffered with a bad tooth and greatly swollen face. Three weeks later the left middle incisor was extracted and temporary relief resulted; the swelling subsided, but ptosis of the left eyelid was noted. However, he was listless and did not play as he did before the trouble with the tooth, and later he developed a sanguineous discharge from the left nostril, and the left eye became fixed. When admitted to the hospital this discharge was evident, but slight. A physical examination showed him to be a rather well-formed boy, and healthy, except for the local trouble and a tendency to breathe through the mouth.

The eye examination showed slight exophthalmos, paralysis of all the external muscles of the eyeball and almost complete optic atrophy. Until this time there had been no loss of weight.

On February 13th transillumination showed complete darkness of left side of face. Right side showed ring of light under eye. The hard palate showed slight fullness.

On February 16th the left nostril was occluded by a friable vascular mass; fullness of palate had now become a distinct bulging and there was some fullness of the left side of the face.

The examination of February 20th showed paralysis of third, fourth, motor fifth, sixth, seventh (slightly), and eighth cranial nerves. There was now some elevation of temperature. Pain became severe and face quite swollen. During the night the right palate broke down, with considerable hemorrhage. Eye now bulged and lips were swollen and inflamed. Moderate purulent discharge from left conjunctival sac.

March 1st, evidence of severe dacrocystitis with profuse purulent discharge. With this, the swelling largely subsided.

The hole in the palate was about the size of a quarter. Gradu-

ally the boy became irritable, although complaining of little pain, and on March 18th was found to have lost much weight.

He now had aphonia and a laryngeal cough. The tumor grew rapidly and death resulted on March 26th.

DR. JOHN H. JOPSON referred to a paper by Coley in which he reports a case of sarcoma of the femur at the age of eighteen months and one of sarcoma of the humerus at that of twenty months, and states that these are the youngest cases of sarcoma of the long bones that have been reported. Dr. Jopson's impression was that sarcoma of the cranial bones is more common in children than is sarcoma of the long bones.

In the case presented by Dr. Graham, Dr. Jopson thought that the evidence points to a primary involvement of the upper maxilla; and, from the early involvement of the eye, probably a primary involvement of the body of the bone, rather than of the alveolus.

TWO CASES OF INTRAUTERINE FRACTURE OF THE TIBIA.

DR. C. H. MUSCHLITZ reported 2 cases of intrauterine fracture of the tibia. First, a male, age seven weeks, with family history negative, and no evidence as to the causation of the deformity. The right leg about its middle fourth was in a position of calcaneo valgus, and was considered as such until closer examination revealed it as intrauterine fracture of the tibia. Manual osteoclasis corrected the deformity, and since operation it has been in good condition.

The second case, a male, age four years, with family history negative, had anterior bowing of the left leg at the junction of the lower and middle third. For one year wore a brace, and when two years of age was operated upon. The deformity recurred. The second operation was performed when the child was four years of age, in which cuneiform osteotomy was done and fragments wired. Position of leg was good.

In both cases above mentioned shortening persisted, but union seems firm. The term pseudoarthrosis was not considered a good one for the above cases since there was no mobility of the fragments.

The etiology of this condition was briefly reviewed and disease of the amnion was considered the most probable cause of this deformity. Treatment was also reviewed, and mention was made

of Codivilla's method of periosteal transplantation in which he had obtained good results.

DR. FRANK C. KNOWLES reported a case of

DERMATITIS HERPETIFORMIS IN A CHILD OF SIX YEARS.

A complete review of Duhring's disease in childhood was read and a synopsis of 57 cases of the disease under the age of puberty reported by forty-one different observers. The case reported in full was that of a very nervous girl of six years who had been under observation for nine weeks. The chief points of interest in the case were:—First, that it followed but seven weeks after vaccination; second, that a marked eosinophilia, 33 per cent., was present; and third, that indican was present in the urine. The chief points of difference from the adult form of the disease were also mentioned. The case was reported through the courtesy of Dr. Arthur Van Harlingen, from the Skin Clinic of the Children's Hospital.

Value of Dextrinized Flour in Comparison with the Pure Milk Diet and the Use of Barley.—Gaetano Finizio and Emilia Concornotti (*Ann. di Elett. Med. e Terapia Fis.*, February, 1906) give the conclusions at which they have arrived after feeding two healthy infants for variable periods on pure milk, and on milk with the addition of dextrinized flour, or barley, making careful analyses of the ingesta and the fecal products. They find that in both cases, one of two years and one ten months old, the cereals increased the assimilation of proteid products as well as of all the constituents of the food. As the proteids are among the most putrescible materials of the food and those most likely to generate toxic substances, the use of the cereals becomes of great value in the diet of healthy infants, and also in the treatment of gastrointestinal troubles. There was much less putrefaction with the use of cereals than with milk alone. The dextrinized flour was more valuable than the barley, especially in the younger child.—*American Journal of Obstetrics.*

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. L. C. AGER.

DR. A. W. BINGHAM.

PATHOLOGY.

Lovett, R. W., and Nichols, E. H.: Osteogenesis Imperfecta, with the Report of a Case with Autopsy and Histological Examination. (*British Medical Journal*, October 13, 1906, p. 915.)

The name osteogenesis imperfecta has by modern usage come to be applied to those somewhat rare cases in which multiple fractures occur during intrauterine life or in infancy.

Cases carefully studied in the light of modern pathology are few in number, 14 such cases, with accompanying pathological reports, being available. To conclusions drawn from these is added in this paper the clinical and pathological report of a typical case under careful observation from five hours after birth until death, two months later; it offers the especial interest of having lived much longer than any case yet reported in which a modern pathological examination of the whole body has been made.

Etiology.—Practically nothing is known beyond the fact that there is a strong element of heredity involved—in 15 per cent. of the cases. When a first fracture has occurred early, subsequent fractures may continue well into life. The later in life the fractures begin the fewer they are in number. After four years three to twelve fractures are the more usual number. In 8 of the reported cases there were 162 fractures—the highest number in 1 case was fifty. The union of intrauterine fractures is generally good, but deformity is likely to result.

After birth, union is in most cases good, but is sometimes slow, and in some cases does not occur. The callus is generally small, crepitation slight and pain small in amount. The long bones are the ones chiefly broken, the thigh most often. Deformities may be due to improperly united fractures or to curving and binding of the bones due to the disease itself.

Such children are generally smaller than the average at birth and the extremities abnormally short in relation to the trunk; they are plump, the skin is sometimes thick and edematous. A

cretinoid type of face is frequently seen. The skull is frequently imperfectly ossified.

With the X-rays, the bones cast a feeble shadow and appear thin and atrophic; the medullary cavity seems to be increased at the expense of the cortex.

A study of the cases gives little encouragement for a favorable prognosis in multiple fractures occurring in young infants. The fractures are treated in the usual way; there is no satisfactory treatment of the general condition.

The case was a male, weighing eight pounds at birth. Labor was easy, nine hours in duration; presentation, foot and limb; ether and easy delivery. When the leg was pulled down a snap was felt; there was some cyanosis.

The family history was good for three generations and free from all history of tuberculosis, syphilis and brittle bones. The pregnancy was normal and the child was born at term. Well developed and nourished; the head and face were normal; skin not thickened; no suggestion of cretinism.

Heart, lungs, liver, chest and abdomen normal. The arms appeared normal. The legs appear decidedly shortened in their relation to the trunk. Both legs and both thighs are broken. The right femur shows evidence of a healed fracture about its middle, union is firm, there is little callus. The fracture must have occurred three or four weeks before birth. The left femur is broken at its middle and is a loose fracture. Both tibias are broken at the junction of the middle and lower thirds. The fractures are not particularly painful. Splints were applied and the baby was put on breast milk. Three weeks later the splints were removed and the fractures were found to be united. A month later the left clavicle was found to be broken and there was an old callus on the right humerus, and in the next month the right clavicle and right humerus were fractured. In the fifth month there was an incomplete fracture of the right humerus and the left forearm, making in all ten partial or complete fractures during the first five months.

The child had a good deal of digestive trouble from the start. He was kept lying on a pillow and never handled or allowed to sit up. At six months he weighed fourteen pounds, one ounce, and was fairly well. At eight months he weighed sixteen pounds.

The baby lived to the age of ten months and died after a sick-

ness of three weeks' duration from what appeared to be an attack of influenza.

The pathological findings in this case are given fully and the histology of the condition discussed.

The author concludes as follows:—The process of bone formation everywhere is checked and of an abnormal kind. Metaplasia of cartilage is much greater than normal, while apposition of bone is much less. Formation of periosteal bone is abnormal and incomplete.

The cause of this imperfect bone formation is unknown. It suggests a general disease, the character of which is not clear.

A. W. BINGHAM.

MEDICINE.

Rankin, Guthrie, and Mackay, Ernest C. : Achondroplasia.

(*British Medical Journal*, June 30, 1906, p. 1,518.)

Achondroplasia, though a rare disease, is of ancient origin. Though apparently uncommon, it probably occurs with considerable frequency, but has failed to attract attention because most cases are either stillborn or survive birth but for a short period. The condition has been recognized as a pathological entity only since 1860. The condition has been confused with rickets and cretinism. The general appearance of an achondroplastic child is characteristic. It is a dwarf, with a large head, pug-shaped nose, short and often bowed limbs, a prominent abdomen, and marked lordosis. The disproportion between the extremities and the body is marked. In the normal infant the umbilicus marks the central point between the crown of the head and the soles of the feet; whereas, in the achondroplastic child, the central point of the body is above the umbilicus, sometimes as high as the ensiform, and this relationship continues throughout life. The abnormal size of the head is confined to the vault of the cranium, which is out of proportion to the face. The base of the skull is short because of premature synostosis. The lips and eyelids are thickened and sometimes the tongue. The hair and skin are healthy. The fingers and toes are short and spatulate. The fingers are about equal length, taper, and at about the middle separate from each other, described by Marie as the *main-en-trident*.

The mental faculties remain intact, and education is little less difficult than in normal children. Nothing is known of the etiology of the disease, and little can be said of the true pathology. The common feature is a more or less complete inhibition of the normal conformation of the proliferating cartilage cells in the preparatory stage of ossification. The question of differential diagnosis is not difficult. The only conditions with which achondroplasia is likely to be confounded are rickets and cretinism.

In achondroplasia the characteristic deformities of the disease are present at birth. The stunting of the long bones, the shape of the hands, the lordosis, the sunken nose and the abnormally high situation of the midpoint of the body, are leading features.

In rickets the child is born healthy. The skull is characterized by the hypertrophic bosses and atrophic craniotabes, the chest is contracted, the ribs deformed, the spine curved, the legs bowed, and dentition and speech may be delayed.

In cretinism, though it appears healthy when born, the cretin soon betrays evidence of mental feebleness, while it may be noted that the skin and hair are coarse and thick, there are fatty pads in the supraclavicular fossæ, the facial expression is vacant, the habits are dirty, and the patient is frequently destructive and vicious.

This account of the disease is verified by the following report of a case:—

Boy, aged nine years, was born after a normal labor, but was misshapen at birth, otherwise healthy and vigorous. Nothing unusual in family history. He was nursed for one month and then reared on milk and barley-water. Period of infancy uneventful. Has shown a degree of intelligence above the average for a child of his age and class and has gained two prizes at school. Has never suffered from any serious illness, and is now a bright, engaging, good-tempered child.

The boy is well nourished and has a healthy, smooth skin. The head is abnormally large and disproportionate to the size of the face. The nose is flattened and there is a deep retraction of its bridge. There is pronounced prognathus. The trunk is of average size, the chest shows some of the changes of rickets. The abdomen is fat and protuberant. The midpoint of the body is immediately below the tip of the ensiform cartilage. The arms are short and thick, barely reaching the tips of the great

trochanters. The humerus is only slightly longer than the clavicle. The hands are foreshortened, the fingers taper toward the points, and deviate from one another like the spokes of a wheel. In the legs the bones are shortened, the normal curvatures increased and the extremities enlarged.

A. W. BINGHAM.

Bourneville, and Bord, Benjamin : Case of Mongolian Idiocy. (*Revue d'Hygiène et de Médecine Infantiles*, 1906, Vol. V., No. 3.)

This girl of ten years is a good example of the Mongolian type of idiocy. Father thirty years of age, mother thirty-five years. Neurotic; deserted by her lover during the pregnancy. Baby very small at birth; nursed for two months, then fed artificially; first teeth at two years; began to speak at eighteen months; walked at three years. Usually sits in the position *en tailleur*, and at times sleeps in this position. Had convulsions at four months and at eighteen months. Whooping-cough at two years, measles at ten years. Sometimes wets bed at night. Character is affectionate; does not have attacks of anger; memory fairly good; adores music.

Head is small and round, hair fine, palpebral fissure narrow and oblique from without downward and inward. Has had Mongolian aspect from birth and slight convergent strabismus. Tongue fissured in front, palate arched, mouth open habitually, ears small, hands large with short fingers, heart normal, slight umbilical hernia. Very great worry on the part of the mother during pregnancy is almost constantly present in these cases, and therefore seems to be of real importance. Mongolism is still frequently confounded with myxedema in spite of the numerous cases already published; from this, however, it differs completely.

A. W. BINGHAM.

Porter, J. Houston : Achondroplasia. (*British Medical Journal*, January 5, 1907, p. 12.)

A report of the disease occurring in six members of a family, constituting three generations, with pictures of the father and two sons. It appeared only in the male sex, no females being born in the three generations. The father is eighty years old and the two sons are over fifty years of age.

A. W. BINGHAM.

SURGERY.

Cautley, Edmund: A Discussion on Congenital Pyloric Stenosis. (*British Medical Journal*, October 13, 1906, p. 939.)

The name of pyloric spasm may be given to a group of cases in which certain symptoms, by no means uncommon in infancy, are present and are extremely liable to give rise to an erroneous diagnosis of congenital hypertrophic stenosis.

There is no absolute proof that spasm of the pylorus is present, but certain cases illustrate the characteristic features of the affection. Four such cases are given—one fatal with autopsy and three which recovered. The main feature of them all was severe and continued vomiting. Usually the food is brought up at once, but sometimes a considerable quantity is kept down and then violently ejected. In congenital hypertrophic stenosis of the pylorus almost all cases come under observation during the first three months of life, generally in the first. It is probably congenital in origin and it is rarely compatible with prolonged life.

The symptoms begin within a few hours or days of birth, never later than the second month. They develop just as readily in the breast-fed as in those brought up on the bottle. Lack of appetite may be the first sign, but is often overlooked. Vomiting may be at first simple regurgitation, later it becomes forcible, and the contents of the stomach may be violently ejected to a distance of three feet. Usually two or more meals are kept down, then the whole lot is brought up forcibly. There is no nausea, but the baby is more comfortable with the stomach empty. The amount of vomiting depends upon the food, the degree of the stenosis, and how often the stomach is washed out. The whole meal may sometimes be recovered at the end of two hours, when it ought to have passed out of the stomach. The tongue remains clean and the breath sweet. The state of the bowels is variable; usually there is persistent and increasing constipation. The child wastes progressively, sometimes with extraordinary rapidity.

The physical signs are visible peristalsis, dilatation of the stomach, and a tumor in the region of the pylorus.

Peristalsis is best seen after a meal and is most marked in cases of long duration. Dilatation is most evident in the late stages. If the pylorus is palpable the diagnosis is certain.

Cases may be divided into three classes; *Typical Cases.*—

Characteristic vomiting, constipation, wasting, visible peristalsis, dilatation of stomach and a tumor. *Acute Obstruction and Mild Cases.*—In these there is only partial obstruction. The vomiting varies with the diet. If the stomach is washed out daily and a dilute food given, vomiting may be absent for a week or more at a time, or there may be only a little regurgitation. Enough food may pass through to maintain nutrition. These are the cases which get well without surgical aid. Most of them die from progressive wasting due to insufficient nutrition.

Morbid Anatomy.—In hypertrophic stenosis the pylorus forms a hard, elongated, cylindrical tumor, $\frac{3}{4}$ to 1 inch in length, and about $1\frac{1}{2}$ inch in circumference. In advanced cases it is very hard, white and bloodless. It ends very abruptly at the duodenal end, projecting into the duodenum in much the same way as the os uteri projects into the vagina. On the gastric side there is a distinct limit, but it is more funnel shaped. The enlargement is due to a great increase in the circular muscle fibres. There is a true hyperplasia. There is no proof that spasm of the pylorus produces hypertrophy.

Diagnosis.—The diagnostic symptoms are, in order of importance, the character of the vomiting, the state of the bowels, clean tongue, sweet breath, peristalsis, a palpable pylorus, and a dilatation of the stomach. In pyloric spasm the vomiting is different in character, peristalsis is slight or absent, pronounced constipation is unusual, and there may be diarrhea. There is no tumor, and it is rare for two or more feedings to be retained and then vomited.

A study of 16 cases justifies the following conclusions: The outlook is extremely bad if treatment is purely medical, even when the obstruction is incomplete. Operative treatment by pyloroplasty accords excellent results if it is undertaken early. The greater the marasmus and dilatation of the stomach, the less is the chance of recovery. Operation should not be delayed. The author has never seen a case, in which he was certain of the diagnosis, recover without operation.

Treatment.—The child is given the simplest possible food and in small quantities. In addition, cocain, grain $\frac{1}{100}$, or tincture opium, $\frac{1}{4}$ minim, are given every hour. If there is no improvement in a few days the stomach is washed out daily with a weak alkaline solution.

These methods are suitable for pyloric spasm, but are unlikely to prove efficacious if there is true hypertrophy. Pyloroplasty is the operation of choice. Rectal feeding should be begun immediately after the operation and continued for two days every four hours, and at longer intervals for the next four days.

A teaspoonful of hot water should be given by the mouth every quarter hour for six to twelve hours, and after that a similar quantity of whey. This is increased in quantity gradually, and later peptonized milk added.

A. W. BINGHAM.

HYGIENE AND THERAPEUTICS.

La Fétra, L. E.: The Medicinal Treatment of Enterocolitis.
(*British Medical Journal*, October 13, 1906, p. 930.)

In enterocolitis, whether acute or chronic, the patient should have the advantage of the best hygienic surroundings. The clothing should be light, porous, meshed material or light flannel. The stools and diapers should be scrupulously disinfected. The bed should have a mattress permitting ready ventilation and drying. The room should be light and cool and well ventilated. Cool, dry air is most favorable.

For enterocolitis there is no specific or abortive drug. When the disease is established, rational treatment consists, first, in keeping up the nourishment of the system without adding to the intestinal irritation; second, in elimination; third, in allaying the inflammation; and, fourth, in treating certain special symptoms.

The question of nourishment has been presented in a preceding paper. To secure elimination, the most valuable drugs are the alkaline cathartics, Glauber's salts, Epsom salts, and Rochelle salts. The sulphate of soda is preferable in younger patients, but should be used cautiously in infants under nine months of age, and not used at all when the patient is depressed, with sunken fontanel, low temperature, and evidences of great need of water. The salts are given in repeated small doses, 10 grains to an infant of nine months, and 20 grains to a child two years old, in a teaspoonful of water. For older children Epsom salts are somewhat better, particularly when there are dysenteric stools with much blood. Blood more rapidly disappears from the stools when this method is used early than by any other plan. If vomiting is persistent, and the salts cannot be kept down,

calomel dry on the tongue in divided doses must be employed. Castor-oil finds its best use in the later stages of the disease, given in small doses with bismuth. Elimination by the skin is to be encouraged by bathing twice daily, warm baths being preferred at first. Hot weak tea may also be given.

For aiding elimination by the bowels, by the kidneys, and by the skin, copious high colon irrigations with alkaline saline solution are of great value. Two to four quarts of Hayem's solution, or normal saline solution, made alkaline by the addition of an equal quantity of bicarbonate of soda, are used. The solution may be hot, tepid, or a few degrees cooler than the body, inversely according to the amount of fever. These irrigations may be given twice in twenty-four hours during the period of marked toxemia. Bowel irrigation for checking diarrhea has been greatly overdone, but is of most value when there are small, frequent stools containing mucus and accompanied by tenesmus. Even in this condition the irrigations should not be employed more than once a day or every second day. In sudden collapse hypodermoclysis may be resorted to. If prostration is very marked in spite of these efforts to promote elimination, atropin may be given hypodermically, $\frac{1}{1000}$ grain, every two hours, until the physiological effect is obtained.

For stimulation, if the child is not vomiting, the tincture of nux vomica or tannate of quinin are good, or suprarenal extract in capsule or powder. If there is vomiting, hypodermic injections of strychnin, gr. $\frac{1}{300}$, and camphor oil every two or three hours may be given.

To allay the inflammation after the digestive tract has been thoroughly flushed out and the toxemia has lessened, the inflamed intestinal mucous membrane should be powdered with bismuth; 15 or 20 grains of bismuth subnitrate or subgallate, combined with one-fourth that quantity of zinc oxid, should be given every two hours. Sodium salicylate or creosote may be given with peptonoids as intestinal antiseptics. If there is excessive peristalsis, the bowels moving after every feeding or drink of water, opium should be used, $\frac{1}{2}$ grain of Dover's powder or 5 m. of paregoric after each loose stool. In vomiting cases, or those with much restlessness, morphin, gr. $\frac{1}{100}$, should be given hypodermically.

For the fever, hydrotherapy; if a fulminating case, or those occurring in humid weather, behaving much like heat-stroke,

cold friction packs, or evaporation packs with fanning, should be applied every hour or two until the temperature comes down to 100°F. Lavage of the stomach, cool irrigations of the bowel, ice compresses to the head and heat to the extremities may be needed.

For pain and tenderness along the colon, the electric pad or mustard paste, or ice coil, or ice bag. Heat is preferred in smaller children. Persistent mucous stools: discontinue irrigations, general tonic treatment and bismuth. Frequent small bloody stools which come usually from the colon: high irrigations of gelatin solution, containing adrenalin or 10 per cent. solution of protargol once a day for two to three days.

Abdominal distention.—Irrigations containing turpentin, also stupes and mustard compresses, together with strychnin hypodermically.

Tenesmus.—Irrigations of starch paste with or without opium; of oil, or of gelatin solution. The anus and prolapsed rectum may be anointed with 5 per cent. cocain ointment.

A. W. BINGHAM.

de Castro, Luis: Infant Mortality. (*American Medicine*, October, 1906, p. 360.)

Dr. de Castro is a Spanish physician practicing in Manila, P. I. This article contains an account of a peculiar disease which the doctor says is a frequent cause of death in children between six months and two years of age. It is generally considered in the islands to be a form of eclampsia or epilepsy. [The symptoms given are highly suggestive of an acute infection of some kind—possibly due to the malarial organism or some new parasite of the animal kingdom.]

Dr. de Castro describes two types of the disease. One begins with sudden loss of voice, the other with attacks of meteorism. There may be slight fever. This first stage lasts about six days. This is followed or accompanied with digestive disturbances. Apparently, the terminal stage is due to acute kidney congestion—urine diminishing in amount, anuria, somnolence, convulsions, coma, death.

[The vital statistics of the Philippines for 1903 give "Convulsions" as a cause of 3.6 per cent. of all deaths in the islands, as compared with 1.5 per cent. in the United States. The figures for "Epilepsy" are respectively 5.1 per cent. and 0.3 per cent.]

LOUIS C. AGER.

ARCHIVES OF PEDIATRICS.

Vol. XXIV.]

NOVEMBER, 1907.

[No. 11.]

Original Communications.

ANOREXIA NERVOSA IN CHILDREN.*

BY F. FORCHHEIMER, M.D.,
Cincinnati, O.

The peculiar affection which is the subject of this paper was first described by Laségue in 1873 under the name of "l'Anorexia Hystérique." Independently of him, Sir Wm. Gull described the same condition in 1874, giving to it the designation of anorexia nervosa because, as he says, it also occurs in males. In 1894 Collins and Soltmann reported the first cases in children, the latter adding another name for the condition—anorexia cerebialis, or corticalis. The next year (1895) C. F. Marshall recorded a fatal case in a girl of eleven years of age in which the autopsy revealed the same absence of lesions as was found in Gull's fatal case (1896). Since that time the affection has been usually taken up in connection with hysteria, and it has been looked upon as one of the manifestations of hysteria.

The condition may be defined as one of anorexia, in neuro-pathic girls and boys, accompanied by loss of weight; sometimes terminating fatally with no organic lesion found. According to the present state of our knowledge, we are justified in calling it a neurosis, or a psychosis. The anorexia may be complete or incomplete in that the patient takes no food at all or restricts himself to certain articles of diet. But there must be absence of organic lesion which would explain the anorexia.

According to this definition, those conditions found in spoiled, pampered children who live upon improper food, both as to quantity and quality, are not to be considered under the heading of anorexia nervosa; in them there is no loss of weight as a rule. Neither should the loss of appetite which accompanies the anemias, the gastrointestinal diseases, so-called scrofulosis or

* Presented before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 7, 1907.

tuberculosis be considered under this heading. Notwithstanding the fact that here the anorexia itself may resemble that of the minor form of anorexia nervosa, there is always some other disease which explains the loss of appetite. As a rule the children who suffer from anorexia nervosa are such as have been permitted to grow up without discipline; eating much or little and choosing their own diet. The milder form of anorexia nervosa is represented in the following:—

A. B. Female, aged seven years. Both mother and father neurotic and of neurotic descent. Three other children in the family, one of whom is an idiot. Nothing abnormal was found in the child until she was six years of age, although the mother states that the child has an uncontrollable and violent temper. The child, furthermore, must have its own way, and always does have its own way. At the age of six she made up her mind that she could limit her diet to certain articles of food, and take small quantities of them. No reason could be assigned for this; she simply would not eat anything except meat, vegetables in small quantities and cheese or salad in large quantities. The two latter articles of diet were permitted by the indulgent parents, but only in small quantities. Constipation was the only thing complained of, aside from the loss in weight, sleeplessness and general unhappiness. When she was brought to me I found the following: A pale, emaciated child, weighing 34 pounds (the average weight for her age being 41 pounds). Physically, nothing wrong could be found; urine small in quantity, specific gravity somewhat increased, normal constituents normal, no abnormal constituents. The blood examination showed slight reduction in hemoglobin, otherwise nothing. Examination of the nervous system showed that she was suspicious, willful and very difficult to examine. It was only after the exercise of a liberal amount of patience that she permitted me to examine for the sensory stigmata of hysteria, which were found absent, in so far as one can say this about a child of this sort after one examination; I may add, however, that after she became better acquainted with me, repeated examinations in this direction showed that she was intelligent and consistent in her responses, so that I am justified in stating that these stigmata were absent. She was put upon the proper treatment and, after four weeks, was discharged cured, having gained 9 pounds, eating all that was given her,

her bowels moving normally and her sleep normal. All evidences of malnutrition were gone and the patient was acting as became a child of her years.

A second case, belonging to the same class, is the following:—

M. X. Female, aged twelve years. Both mother and father neurotic. The child was brought up on artificial food. According to the mother's account she had never been ill, but had never eaten like other children. She was in good condition until a year ago, when she began to limit her diet practically to pickles, salad and olives; if she was forced to take anything else it was promptly vomited, so that the parents refrained from making suggestions to the child. With this she began to run down, became languid, lost ambition, fell behind in her studies, and was mortally unhappy. She was far advanced in her studies, for her age, and besides her school work took extra lessons in additional studies in the direction of the higher education for women. Gradually she grew irritable and cross, began to make excuses in order not to go to school, lost weight, cried easily and slept badly. Her appetite was getting worse and worse and she was becoming more emaciated. One day in getting out of a street car she suddenly fell down, could not walk nor stand and had to be carried home. That night she alternately wept, moaned or screamed, saying that she did not want to die, but that "God was going to take her." The next morning I was called to see her and found the following:—An emaciated, hollow-eyed, frightened and pale girl of normal development as to size, and in pubescence. She was lying in bed with her legs bent, but moving about in the bed whenever she desired to do so. Temperature normal, pulse and heart of the characteristic neurotic reaction. No evidence of organic lesion to be found; all the special examinations which were made showed nothing abnormal, except a slight increase in indican and a diminution in hemoglobin. While talking to her and asking her questions she broke out in floods of tears, off and on; this was associated with tossing of the head; then would come a period when she would become aphasic; this would pass into a stage of aphonia and finally she could talk again. When lifted out of bed she could neither walk nor stand; all attempts failed and she would immediately collapse with bent knees (*astasia-abasia*). She complained of pains in her head, in her extremities and indeed everywhere, which were increased decidedly upon pressure. But even when there was no pain she was hyperesthetic.

The knee jerk was increased and there was ankle clonus. In the course of the condition she became very much depressed, developed paralysis of the rectum and bladder, at times was violent, but always tried to have her own way in everything—when crossed there was a violent crying spell or a long period of sulking. She weighed 54 pounds (average weight for age and size, 68 pounds). She was put upon the proper treatment, gaining 16 pounds in six weeks, and being restored to health.

The severe form is represented by the following, which I saw in consultation with Dr. A. Friedlander. It has already been reported, so that I content myself with an abstract of his report. The case is of great importance for our discussion of the etiology of the affection besides being the youngest patient on record with anorexia nervosa.

G. W., male infant, one year old; the mother neurotic, the father and his family also. In addition, the father has had syphilis, many years before marriage. Child free from any syphilitic manifestations. It had eight teeth, weighed 25 pounds and had never been ill in any way. It was breast fed, and its mental development perfect. From the ninth month attempts were made to add artificial food which were unsuccessful in that the child would not take anything, although it always drank water from a cup. When the child was a year old, weaning was instituted, and because of the neurotic mother this was entrusted to a trained nurse. But the child would not take food; it would nurse once a day and also take water. We then decided to remove the child from its mother, taking it to a hospital. For four days and nights nothing was given by the mouth, normal saline solution being given by the rectum in order to supply fluid. Then feeding was begun, the following foods being tried: milk, cocoa, gruels, cereals, hot food, cold food, warm mixtures, sweet mixtures, salted mixtures of various kinds—all to no avail; the child would drink water and nothing else. During all this time the child had lost 3 pounds, and, as it would not eat, gavage was resorted to. Eight ounces of a milk and barley-water mixture were given four times a day. This was kept up for two weeks constantly, attempts at natural feeding being continuously made. At the end of the second week the child began to take some food; gavage was then not so frequently given. At the end of the third week the child took sufficient food, so that gavage was no longer necessary. After this, improvement was rapid, so that in another

month the child was taking a variety of foods and had gained 4 pounds in weight. At no time was there any evidence of psychological disturbance; indeed the child was normal. In "this respect the child even during its starvation period appeared perfectly contented, crawled about the floor of its room, played with its toys, enjoyed its daily outdoor ride, and slept well."

The fourth case—a boy three years of age, the only child of parents who had married late in life, both parents being neurotic—again represents the severe form. Aside from trifling bowel complaints and slight febrile attacks the previous history was negative. The father, a man of sixty, stated to me that neither he nor his wife believed in discipline in the bringing up of children, and it was his principle never to deny anything to his child, which had been lived up to in every respect since the child was born. For some time, however, the boy had been cutting off articles from his diet until at present he hardly ate anything. He would drink water, but at times he would hardly touch food for several days. When he ate at all, it would be to suck one or two pieces of fried bacon, possibly to swallow some of it, and to eat one-half of a banana. I found an emaciated child lying upon the lap of his mother, eyeing me with suspicion, but apparently not afraid of the doctor. When I began to examine him, however, he resisted with the remnant of strength left in him, and his parents joined issue with him. I finally succeeded, after the exercise of much patience, in having the child undressed to find a condition of emaciation that I have rarely seen. Upon weighing the child the next day it was found that he weighed only 18 pounds (average, 30 pounds). In addition, he had furuncles and other evidences of lack of care of the skin. No organic lesion was found. The child was exceedingly sensitive upon pressure, otherwise nothing was found which might be called a hysterical stigma. The pulse was weak and the temperature subnormal (97° F. in the rectum); the urine that of starvation. The lower extremities were edematous and the face pale and slightly puffy. After a careful study as to patient and surroundings I mapped out the course of treatment to be followed. The first and principal measure—removal of the child from the care of the parents—was met by an absolute refusal. Thereupon I withdrew from the case. Three weeks after this the child died from starvation.

A number of these cases might be cited, but these four have

been chosen as typical examples from which, possibly, some deductions may be drawn as to etiology. We know nothing of the essential nature of hysteria; all that we know is that there are certain manifestations which go to make up this disease of hysteria; in other words, our knowledge is confined to the clinical manifestations.

In children, hysteria presents a peculiar clinical history, depending upon the age of the child. The younger the child the more does it tend to be monosymptomatic and the rarer are stigmata; the older, the more does it approach the adult form. In the young child the single symptom is a "massive" one (Bruns). It controls the whole clinical picture, and there are no stigmata; indeed, very few could be detected even if they were present in an infant. In the 4 cases reported, these characteristics are fairly well marked. In the infant, Case III., there is no other symptom present except the anorexia, no psychical or physical evidence of hysteria. In Case I. we have psychical evidences, in Case II. we have the adult form of hysteria and in Case IV. there is the anesthesia. Aside from Case III., all may be considered as hysterical because they all had some stigma and had a neuropathic history.

In Case III. the whole question of infantile hysteria comes up for discussion. Most authors claim that hysteria does not occur before the second or third year of life. But Chaumier (1892), and after him a number of French authors, have claimed that hysteria occurs in early infancy, stating that irritability and convulsions are evidences of hysteria (the symptoms that are usually ascribed to teething). It seems to me that Thiernich's objection to Chaumier's views is a valid one; that even if such children who had suffered from infantile convulsions had a neuropathic history more frequently than others or afterward became nervous or hysterical, it would not prove that the eclampsia could be called hysteria.

In this child there was nothing of this sort; the essential and only features which would make us think of hysteria are, from an etiological point of view, first, the family history, and secondly, the peculiar way in which this child was brought up; there was no evidence of psychical alteration; only these two facts and the symptom anorexia.

I have seen a large number of infants who refused food after weaning. I have also seen a number who, although forced to take

food, immediately vomited it; in all these cases where proper discipline was employed the children gave in to that method of feeding which seemed proper to those in charge. In this case there was an attempt at weaning which was given up by the weak mother because the child would not eat. Afterward, in the hands of the trained nurse, the child did the same, so that forcible feeding became necessary, all the time taking water in the normal way. Finally, at the end of two weeks, the child began to take food. In older children this is a condition that might be explained by taking into consideration autoimitation. When first artificial food was given the child would not take it because it tasted differently, had a different consistency, was taken differently or what not. When the attempt was again made it again refused because it had done so before; finally it continued to refuse. It may be doubted that in so young a child so complex a psychic process could have developed as that necessary for autoimitation. Yet here was a precocious child, and, after all, although we are justified in considering with Jolly the psychic processes in infants as simple, we are not in a position to determine how simple they are; indeed, those who see much of infants are frequently forced to the conclusion that they may be quite complex. However this may be, under all circumstances, I believe, we are justified in considering the anorexia as a psychical manifestation; if this is admitted, the whole clinical picture in the patient leads us to the inevitable conclusion that we are dealing with infantile hysteria. Since I treated my first patient with anorexia nervosa in 1891 I have never seen any case except the one just discussed in which there was any doubt as to Laségue's view of the etiology, viz.: that it is hysteria or hypochondriasis. It is interesting to note, furthermore, that Laségue described in 1873 very much the same psychical process as leading to hysteria as is now accepted by the most advanced neurologists.

It will be seen that, of the cases reported here, 3 recovered and a fourth one died, the latter not being permitted to come under treatment by its parents. I believe that all these cases can be cured (and here I am in accord with the modern writers) provided they are properly treated. This statement does not mean that they can be cured of their hysterical tendencies, but only of the condition now under discussion. It does mean, however, that by proper treatment during childhood the hysterical tendencies are so reduced that, in a number of my patients, what seem to all

appearances as normal adults have developed from extremely neurotic children. The discussion of the prophylactic treatment would lead us too far from our subject, but especial stress must be laid upon discipline of thought and action, which should be begun at birth by regulation of habits and continued in older children in all directions until these activities become almost automatic, when self-discipline is arrived at. Aside from this, all the prophylactic measures for hysteria in children should be carried out when possible. For the treatment of anorexia nervosa the general therapeutic measures applied in hysteria should be carried out. In order that a child be cured of it there are required: a proper physician, a proper nurse and proper surroundings. The characteristics required of the physician have been so frequently described that I desist from repetition except to state that "the pure scientist should keep his hands off these cases," as he not only fails, but also "spoils them for future treatment by others who understand the art." The art consists in the treatment of the mental state, which, after all, is the essence of the condition. This is done by suggestion. Recently works have been written in which the various methods have been classified and described. He who uses the art of suggestion as described in books will never accomplish much, because it is with this art as it is with all other arts: there are certain things which are born in an artist and which are gained by experience, the deficiency of which cannot be made up by books. After all, suggestion is most easily carried out in children; indeed, suggestibility is one of the characteristics of the child's mind; it is not then so difficult as it is in adults. It is more valuable in older children than in infants; according to my experience with the latter, force is more frequently required than suggestion.

But before going on with suggestion, it is necessary that the physician study his individual patients to find out their peculiarities and adapt his methods to these. After having studied the patient as to habits, temperament, and having closely watched all the manifestations, at the same time trying to gain the patient's confidence, a plan of treatment, mental and psychical, is mapped out. This should be followed consistently and with firmness; the child is then, as it were, driven with a firm bit which must neither be pulled upon nor relaxed for ordinary purposes. Occasionally it may become necessary to start with severe measures and then relax, or it may become necessary, during the course of the treat-

ment, to make the suggestive measures severe. Drugs may be used as suggestive measures, as in the hysteria of adults. Electricity and hydrotherapy are also most valuable in this direction; I do not wish to be understood as saying that this is the only way in which they are valuable.

The nurse should be chosen as for every other case of hysteria; she should have special interest in children, and it is better if she has had special training.

The surroundings are of paramount importance. In order that the best results may be obtained the child must be removed from its ordinary surroundings. This principle, first expressed by Weir Mitchell for the treatment of hysteria, is of even greater importance in children than in adults. The best thing that can be done for these children is to remove them to a properly equipped institution of some kind. But it is practically impossible to convince parents that this is necessary and that the mother is not the proper person to take care of this kind of illness. It then depends upon the urgency of the symptoms, in anorexia nervosa, whether it is possible to compromise so as to carry out seclusion in the home. If the child presents serious symptoms of starvation no compromise should be entered into; under these circumstances the parents are ready to submit to any measure in order to save the child's life, although exceptions occur, as in Case IV. When the other symptoms of hysteria are the prominent ones and the starvation is not excessive, a compromise as to home treatment may be entered into. But it has been my experience that, in a majority of cases, the rest cure when carried out at home does not give the same results as when carried out in an institution. A number of these cases have relapses when treated at home or do not get well at all, but simply improve. The reasons for this are obvious: in very few instances has it been possible to keep members of the family out of the room of the patient for from six to eight weeks, and one outburst of hysterical sympathy does more harm than can be overcome by a long isolation. Moreover, it is helpful to have the suggestive effect of strange surroundings. My own practice is to inform the parents that home treatment is a compromise, that it is not the best method of treatment, that relapses occur, but that it may be tried with this understanding, provided always there is no danger to life.

In anorexia nervosa the feeding, after all, is the controlling factor in the situation. In most cases, where children come under

complete control of the rest cure, with all its many routine performances, the taking of food naturally becomes one of these routine acts. In such cases large quantities of food of the nature suitable to the child's age may be given, the object being to cause increase in weight and to improve tissue nutrition; milk, eggs and cereals to begin with form an excellent dietetic basis to build upon. In those cases where the routine does not produce this effect, feeding taxes the skill, the patience, the endurance and the resourcefulness of the physician to the utmost. Rectal feeding is of even less value in the child than in the adult; at the utmost, fluid can be added to the circulation by it, which is, it is true, of importance in the prevention of absolute starvation, but that is all, except suggestive effects. I have succeeded more than once in inducing this kind of child to take something to eat by leaving food by its bed, and asking the nurse to give it a chance to eat it without being seen by her. This is only in accord with the simulation which the child has been practicing for a long time, but which, as Jolly says, must not be spoken of aloud as existing in connection with hysteria. While this method of stimulating simulation does not cause the child to gain in weight, yet it prevents loss, and, moreover, it gives the physician a decided advantage, as it may be used as the thin end of a wedge. Gavage must always be held up before the child as the last resource; it is well to speak of it casually to the nurse when things go badly, finally making direct threats to the patient. Of the large number of cases which have been under my care, the infant reported here is the only one which required gavage.

The other hysterical symptoms present in the patient require further treatment, as a rule; in the patient with astasia-abasia the anorexia was controlled, but the astasia-abasia remained for some time longer.

All other routine methods which are required for the rest cure must be applied in addition to those recommended.

LITERATURE.

- Laségue, C. "De l'Anorexia Hystérique." Arch. Gén. de Méd., 1873, Vol. I., pp. 385-403.
Gull, W. W. "Anorexia Nervosa." Transactions of Clinical Society, London, 1878, Vol. VII., pp. 22-28.
Gull, Sir W. "Anorexia Nervosa." Lancet, 1888, p. 516.
Playfair, W. S. "Note on the So-called Anorexia Nervosa." Lancet, 1888, Vol. I., p. 817.

- Collins, W. J. "Anorexia Nervosa." *Lancet*, 1894, Vol. I., p. 202.
- Stephens, L. "A Case of Anorexia Nervosa. Necropsy." *Lancet*, 1895, p. 31.
- Marshall, C. F. "A Fatal Case of Anorexia Nervosa." *Lancet*, 1895, Vol. I., p. 817.
- Soltmann, O. "Anorexia Cerebralis und Centrale Nutritions-Störungen." *Jahrb. f. Kinderh.*, 1894, N. F., Vol. XXXVIII., p. 1.
- Jolly, F. "Ueber Hysterie im Kindesalter." *Berl. Klin. Wehnschr.*, 1892, No. 34.
- Thiemich, M. "Ueber Hysterie im Kindesalter." *Jahrb. f. Kinderh.*, 1903, N. F., Vol. LVIII., p. 881.
- Bruns, L. "Die Hysterie im Kindesalter." *Jahrb. f. Kinderh.*, 1903, N. F., Vol. LVIII., p. 895.
- Meyer, O. "Beiträge zur Kenntniss d. Hysterie im Kindesalter." *Jahrb. f. Kinderh.*, 1905, N. F., Vol. LXII., p. 173.
- Friedlander, A. "A Case of Anorexia Nervosa in an Infant." *Interstate Medical Journal*, St. Louis, May, 1906.

DISCUSSION.

DR. CHARLES G. KERLEY.—I am reminded by the doctor's paper of a case I had under my care two years ago—a four-year-old girl, anemic, small for her age, with the story of vomiting that occurred at the table. She had had a poor appetite, had to be urged to eat, and then once or twice a day, particularly every time she came to meals, she vomited, so that her nutrition was decidedly interfered with. I advised with them for two or three weeks, but every effort was without avail. The mother would insist upon the child eating and then watch for the vomiting, and the child learned not to disappoint her. I suggested that she absent herself from the table and have the child fed in her absence. Then I found that the child was fond of the maid-of-all-work, and suggested that the child be allowed to eat in the kitchen, and, greatly to the mother's surprise, the child ate there without vomiting. This continued for some time and the child gained in weight. Then the maid, having lost a sister, had to go to the funeral, and at the first meal the mother fed the child it vomited, and that continued for three days. When the maid came back the child ate in the kitchen and again the vomiting ceased. Later the maid left for good and the child again took its place at the family table, and the vomiting again occurred. I then suggested the removal of the child from home, having her sent to an aunt who had several children. This was done, and I have not heard anything of the child for six or eight months; presumably she is doing well.

DR. PUTNAM.—Dr. Forchheimer's illuminating paper relates mainly to the more severe cases of the affection, but lighter cases are more frequent and not devoid of difficulties in managing them, and I should like to mention one or two points that suggest themselves.

An unfortunate element in such cases is often the daily insistence of parents and nurses that a child should eat before leaving the table, for thereby the child gets the notion of putting itself in opposition whenever the thought of food comes up. Many a time it has been a great success when I have been able to persuade parents not to put up a fight about food, but to let the child go without eating, if it wishes, when hunger will sometime come to the rescue. This is, of course, difficult to carry out, because a sensitive child seems to feel the mental state of the mother or nurse without a word being said.

On the other hand, there are cases where actually putting liquid food into the mouth with a syringe, or even into the stomach, makes such an impression that the child will take food voluntarily thereafter.

In one case, which was almost one of self-starvation of a little girl not much over two, who fortunately had been removed from the care of her mother to that of her grandmother, the first beginning of feeding was accomplished by leaving bottles of milk lying round on the chairs, so that the child would go and take them surreptitiously.

In short, the self-consciousness of the child on the subject of food ought to be overcome as far as possible; and when force has to be used, it ought to be in a short, sharp conflict where success is certain. Every unsuccessful attempt to make a child eat, whether by force or persuasion, is a distinct loss of ground.

DR. J. P. CROZER GRIFFITH.—I wish to refer briefly to a case which seems to me might be classified in the group which Dr. Forchheimer has been presenting. It was that of a child of a physician, about twenty months of age, who refused absolutely to take any food but breast milk. As weaning was imperative, I suggested that the infant be fed temporarily by gavage. To my surprise, I found afterward that it had been necessary to continue this for a number of months, all food being refused if offered in any other way. There appeared to be really a total lack of desire for food. A full report of this case will be published in a later number of the ARCHIVES so that it may be on record.

DR. FORCHHEIMER.—I think the point made by Dr. Putnam a very good one. Sometimes forcible and sometimes mild measures must be employed. Every case must be studied on its merits. In one case I had crackers placed near the bed which the child could get when the nurse was out of the room; in another I threatened to operate and place food in the stomach, going to the point of getting out instruments in the child's sight.

Dr. Griffith's case is very important, and should be put on record because cases at that age are comparatively rare. The importance of gavage should be emphasized in these cases; the children should not be allowed to die.

CONGENITAL STENOSIS OF THE DUODENUM.— REPORT OF CASE.*

BY HENRY L. K. SHAW, M.D.,

AND

LEON K. BALDAUF, M.D.,

Albany, N. Y.

Congenital occlusion of the intestine is an infrequent condition. Theremin, in 1877, emphasizing its rarity, states that among 111,401 children this malformation was observed only twice, and in St. Petersburg it had occurred but nine times. At that time no cases had been reported from the foundling asylums in Moscow and Prague. In 1883, Gärtner collected 38 cases; in 20 of these the occlusion had occurred in the jejunum and ileum, in 16 in the duodenum and twice in the colon. Cordes, in 1901, collected 56 cases of duodenal occlusion and added one observation of her own. In 1903, Kuliga, after a very careful search through the literature, succeeded in bringing together 185 cases, 46 of which occurred in the duodenum, 94 in the jejunum and ileum and 45 in the colon and rectum.

The following case, aside from its rarity, is of interest, as the condition was recognized clinically:—

Mrs. C., of Williamstown, Mass., came to Albany for her confinement because she wished her baby to be under the care of a specialist, and was referred by Dr. Snow, of Buffalo, to the writer (Dr. Shaw). In my absence from the country Dr. MacFarlane, of Albany, took charge of the patient, and to him I am indebted for the notes and history of the case.

Clinical History.—The child, a girl, was born July 19, 1906, at 9:50 P.M., at the Albany Hospital, under the care of Dr. MacFarlane. The labor was normal, except for a retained placenta and some postpartum hemorrhage, and the mother made an uninterrupted recovery. The child seemed strong and healthy and weighed 7½ pounds. Twelve hours after birth she passed meconium. She was given small quantities of warm water and vomited a small amount of greenish fluid fifteen hours after birth. She was placed at the breast two hours later and again in two

* Presented before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 8, 1907.

hours, and after the latter feeding vomited a small quantity of greenish fluid which contained particles of a white material evidently milk curds. The next nursing was retained. On the next two days (the second and third after birth) she nursed at the breast; vomited greenish fluid five times, once in large quantity; passed meconium three times; seemed hungry and cried as if in great pain. On July 23d (the fourth day after birth) it was thought that the nervous state of the mother might be responsible for the condition of the child. Nursing at the breast was discontinued and barley water and, later, whey was administered. A greenish-yellow fluid containing white particles was vomited almost immediately after each ingestion of food. Meconium was passed and later a brownish movement showing a small amount of mucus. On July 24th (the fifth day after birth) hot water was given in dram doses every hour, and retained at the longest only twenty minutes. The stomach was thoroughly washed out after the removal of putrid, foul-smelling, greenish contents. During the night there were three small brownish dejections. On the sixth day after birth (July 25th) the stomach was washed out twice and the child vomited only once (a clear fluid two hours after the last lavage). A napkin and some of the vomited material were examined by Dr. H. C. Jackson, of the Bender Laboratory, and bile was shown to be present in both.

Dr. Albert Vander Veer was then called in consultation. On account of the apparent improvement in the gastric condition, and the fact that bile had been found in both vomitus and dejection, it was hoped that the stenosis might be spastic, and operative intervention was postponed. On the next three days the stomach was washed daily, whey was given by mouth and normal saline solution per rectum three times a day. Although she vomited only once in these three days, she grew constantly weaker, and on July 29th, ten days after birth, she weighed $5\frac{1}{4}$ pounds, showing a loss of $2\frac{1}{4}$ pounds. Her condition gradually grew worse in spite of lavage, and an operation having been deemed inadvisable on account of her exhausted state, she died on August 1st, thirteen days after birth.

Autopsy Record (Bender Laboratory 0-1,028).—Postmortem examination made August 3, 1906, by Dr. Baldauf.

Clinical Diagnosis.—Stenosis of the intestine below and near the opening of the common bile duct.

Abdomen.—Subcutaneous fat almost absent. Peritoneal surface smooth and glistening. Spleen not enlarged, free from adhesions. Appendix coiled upon itself and retrocecal; measures about 3 cm. in length. Mesenteric lymph nodes somewhat enlarged, pale and firm. Below the pyloric orifice of the stomach is a dilatation of the intestine including the whole course of the duodenum and extending below the bile duct, giving the organ, from its size and general appearance, the appearance of the stomach. The mesocolon of the entire ascending colon, except a small free edge about 0.5 cm. in thickness, is intimately adherent to the dilated duodenum.

Measurements.—Circumference of pyloric orifice, 2.2 cm.; length of small curvature of the stomach, 5.8 cm.; length of greater curvature of the stomach, 16.2 cm.; circumference of the dilated duodenum, 1 cm. from the pylorus, 3.7 cm.; circumference of the dilated duodenum, 2 cm. from the pylorus, 4.8 cm.; length along the greater curvature of the dilated duodenum, 18.5 cm.; length along the lesser curvature of the dilated duodenum, 9 cm. The stricture lies 5 cm. below the papilla of Vater. The greatest diameter of the dilated duodenum is 9.4 cm.

Below the dilatation is a stricture which will not admit the smallest probe, but through which small amounts of fecal material can be forced. (See illustration on page 817.)

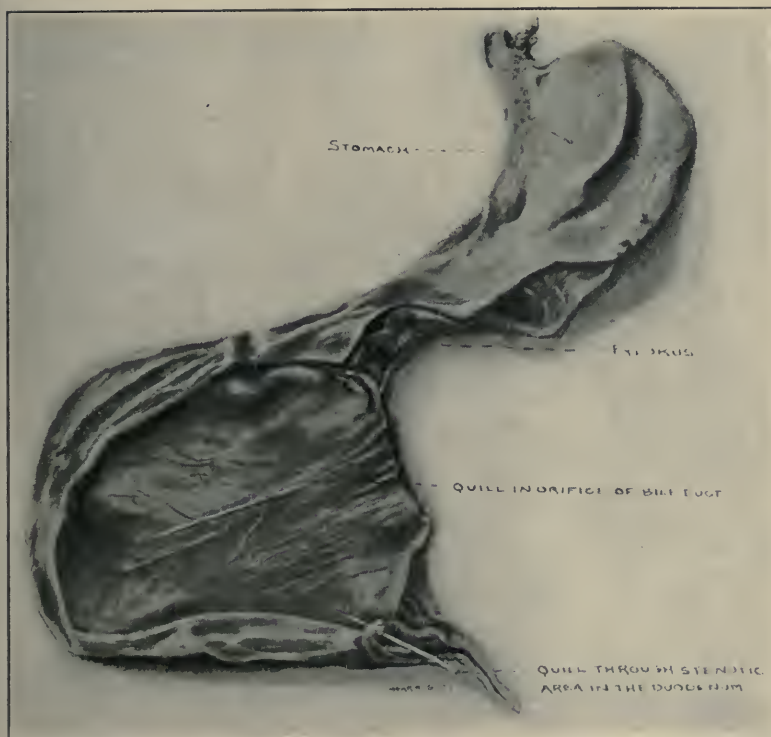
All other organs normal.

Anatomical Diagnosis.—Congenital duodenal stenosis.

Various causes have been assigned as etiological factors in these congenital anomalies. Until very recently no satisfactory explanation has been offered for the larger number of the cases. In many instances associated pathological lesions were considered, but when such did not exist there was recourse only to hypothesis and theory. Silbermann, Theremin and Fiedler have suggested the idea of peritonitis during fetal life as a causative factor. Fiedler does not consider that the absence of any evidence of peritonitis is proof positive that a peritonitis has never existed, for he maintains that a peritonitis may have disappeared without leaving any trace of the original lesion. Such peritonitis is generally of syphilitic or tuberculous origin. According to some authors, the peritonitis must have existed before the third month, because, in the cases examined, where there was total occlusion of the intestinal lumen, no bile appeared in the distal

portion of the gut. Where the syphilitic condition existed so early and the child went to normal delivery, it seems strange that no other signs of syphilis were visible, for in the cases examined no visceral changes were evident. Mauclaire's case, in which he ascribes the occlusion to a tuberculous peritonitis, may have been the result of the volvulus which was present, the tuberculous peritonitis being secondary. This is the view of Schottelius. Küttner, Gärtner, Schottelius, Schlagel and Good believe the condition to be the result of volvulus. A few cases have recently been added to the 13 cases due to volvulus collected by Gärtner. There are some, however, who consider the volvulus secondary to other conditions. Steinthal, Kirchner, Marchwald and others consider the atresias and stenoses part of an intrauterine enteritis. Marchwald, in one of his cases, demonstrated cocci at the seat of the lesion. In a case reported by Chiari, an intussusception was demonstrated. Pressure from without is considered of importance by others; for instance, in a case reported by Wiederhofer an alveolar carcinoma involving the liver was found, in Kristeller's case an enlarged liver, in Hirschsprung and Serr's case a hypertrophic head of the pancreas, in Schott's case a cyst of the ileocecal fossa, in Nobiling's case formation of a loop by the omphalomesenteric artery. As other factors, Jacobi and Charrier laid stress on the formation of amniotic bands pressing and occluding the gut. Hess emphasized the possibility of compression of the duodenum at the point where it pierces the mesocolon. Wyss and Hammer think the stenosis is due to hypertrophic valvulae conniventes, and Bretschneider, Hempel, Schellong and Ahlfeld ascribe an influence to the omphalomesenteric duct. While these various influences may be of some interest in the production of these anatomical lesions and the various hypotheses and theories may apply to a certain number of cases, there are numerous cases for which no cause is evident and no logical hypothesis can be offered. An hypothesis which might apply to all cases could be formulated on a purely embryonic basis. Tandler, in a recent communication, emphasizes the transitory disappearance of the lumen of the intestine in the earliest embryos. In studying the cross sections of the duodenum of a 12.5 and 14.5 mm. embryo, he observed the lumen occluded by an epithelial-like proliferation. He afterward made a systematic examination of 11 embryos ranging from thirty to

sixty days old. In the two youngest embryos the duodenum was visible with an open and unobstructed lumen. In the next older, an increase of the epithelial elements had begun with evident narrowing of the lumen, while in the next two older embryos the increase of epithelial cells and narrowing of the lumen were more evident. This became more marked in the next older



PREPARATION OF STOMACH AND DUODENUM SHOWING STENOSIS.

embryo, while in the three oldest embryos there was a disappearance of the epithelial cells and the intestine had assumed its original appearance. To summarize: In the youngest embryos the lumen of the intestine was easily visible, but later the lumen disappeared on account of a proliferation of epithelial cells. Later, however, the epithelial cells became absorbed and the lumen reappeared. If these observations be accepted, we may find an explanation of many cases of atresia and stenosis; the atresia be-

ing dependent upon the nonabsorption of the hyperplastic epithelium and the stenosis upon its partial absorption.

LITERATURE.

- Theremin. "Ueber congenitale Oclusion des Dünndarms." *Deutsche Zeltschr. f. Chir.*, 1877, Vol. VIII.
- Gärtner. "Multiple Atresien und Stenosen des Darms bei einen neugeborenen Knaben." *Jahrb. f. Kinderheilk.*, 1883, Vol. XX., p. 403.
- Cordes. *ARCHIVES OF PEDIATRICS*, 1901, Vol. XVIII., p. 401.
- Kuliga. "Zur Genese der congenitalen Dünndarmstenosen und Atresien." *Beiträge zur Pathol. Anatomie*, 1903, Vol. XXXIII., p. 481. (Complete summary and bibliography to date.)
- Clogg. "Congenital Intestinal Atresia." *British Medical Journal*, 1904, Vol. CLXVII., p. 1,770.
- Tandler. "Ueber die Entwicklung d. menschl. Duod. im frühen Embryonalstadien." *Centralblatt für die Gesamte Wissenschaftliche Anatomie*, 1900, Vol. XVIII., pp. 42-44.

DISCUSSION.

DR. JACOBI.—I can give the literature of at least 2 cases. In 1860 I published a case of multiple obstruction, and a case from the practice of a colleague of multiple obstruction in which the patient lived forty-three days. It was published in 1860 in the *New York Medical Monthly*. At that time the cases were very rare.

Playgrounds in the Prevention of Tuberculosis.—Favill, in the *Chicago Medical Recorder*, states that to the child the playground must be made attractive, wholesome and so unrestricted as to give every child a proprietary interest. On the other hand, by every conceivable means the elders must be made to realize the privilege and beneficence of the playground, and brought into actual cooperation in magnifying the interests of children as a principle of their upbringing. To bring the unenlightened parent, or even the so-called unenlightened parent, to value the playground as he values the schoolroom is a colossal undertaking, but unless this can be accomplished the work will fall far short of its legitimate possibilities.—*Journal of the American Medical Association*.

THE REPORT OF A CASE OF AMYLOID DISEASE.*

BY HOWARD CHILDS CARPENTER, M.D.,

Assistant Pediatricist to the Philadelphia General Hospital.

C. M., colored, was admitted to the Philadelphia Hospital February 24, 1903, when eight years of age.

The father was apparently well, but mother dead from cause unknown. The patient had the usual diseases of childhood. The only history of the present condition we have is that three months before admission he was operated on at the Philadelphia Polyclinic Hospital for tuberculous sinuses. On admission to the Philadelphia Hospital he had two sinuses, one anteriorly in the right iliac region, and one posteriorly in the lumbar region. These discharged freely a mucopurulent material, which looked like tuberculous pus. The physical examination on admission showed a fairly-nourished, rachitic boy, with Pott's disease of the third, fourth and fifth lumbar vertebræ. The abdomen was distended, but the spleen was not palpable. The heart and lungs revealed nothing of importance.

In the four years this boy has been in the hospital, his abdomen has slowly increased in size, and he has become much more emaciated; the change in his condition has been very gradual. The sinuses, in spite of treatment, have persisted. He has an evening rise of temperature of, on an average, 2° F. His pulse averages 125, and respirations 40. He has a slight cough, but no night sweats. The bowels are somewhat constipated.

At present his physical examination reveals a very emaciated colored boy, the most striking feature of whose appearance is a very prominent abdomen. He has a large box-shaped head, dolichocephalic, with high frontal eminences. His head is 52 cm. in circumference. He has exophthalmos; the pupils are equal and react normally. The mucous membranes are pale. Several teeth are carious. He has a geographical tongue, and slightly hypertrophied tonsils. The chest is flat, with a marked rachitic rosary, 58 cm. in circumference at the level of the nipples. There are diminished expansion and impaired resonance with prolonga-

* Read before the meeting of the Philadelphia Pediatric Society held April 9, 1907.

tion of expiration at both apices. Vocal fremitus and resonance are increased, especially at right apex. Posteriorly there is a small area of bronchial breathing and impaired resonance just inside of the angle of the right scapula. The apex beat is diffuse,



SHOWING POSITION OF THE ENLARGED
LIVER AND SPLEEN.

felt best in the fifth inter-space, just outside of the nipple line. The cardiac dullness is not increased. A hemic murmur is heard all over the precordium, loudest at the base of the heart. The abdomen is very large, especially the two upper quadrants. It measures in circumference 72 cm. The abdominal walls are very thin, with a separation of the recti muscles and flattening out of the umbilicus. The liver is enormously enlarged; it extends 15 cm. below the edge of the ribs in the mid-clavicular line, and 19 cm. below the ensiform cartilage in the midsternal line. The right lobe of the liver extends below the right iliac crest. The notch on the anterior border of the liver can be easily felt. The liver feels firm in consistence, the surface smooth, and the edges

rounded. The spleen is enlarged, extending 6 cm. below the edge of the ribs. The mesenteric glands cannot be palpated.

There are two sinuses, one in the right inguinal region, and the other higher up, posteriorly, in the right lumbar region. These sinuses both discharge freely a thin, offensive, tuberculous-looking pus. There is necrosis of the third, fourth and fifth

lumbar vertebræ, but with very little external deformity of the spine. Patient has general glandular enlargement, especially of the cervical, axillary and inguinal glands. There is no jaundice, cyanosis, edema or ascites.

His urine has been examined three times in the last four months. The results of all three examinations have been similar. The urine is amber in color with no sediment. The specific gravity is 1.010. Albumin is present. A quantitative estimation of this shows .05 per cent.

A skiagraph taken January 11, 1907, shows enlargement of the spleen, and great enlargement of the liver.

Blood examination: Hemoglobin, 75 per cent.; red blood corpuscles, 4,230,000; white blood corpuscles, 17,800.

Differential count of white cells:—

Polynuclear	78 per cent.
Small lymphocytes	11 “ “
Large “	10 “ “
Basophiles	1 “ “

This boy, with tuberculosis of the spine, undoubtedly has general tuberculosis, involving the lungs, liver, spleen and other organs.

I realize my diagnosis of amyloid disease is not positive. As a rule, in general tuberculosis the liver is enlarged, in part due to tuberculosis of the organ, but also due to fatty change in the organ. The spleen is also enlarged in general tuberculosis. Then, again, the diagnosis of amyloid disease should always be made with reserve, as I do not think amyloid degeneration is as common as generally believed.

In about twenty-five tuberculous autopsies I have taken part in performing at the Children's Hospital of Philadelphia, I cannot recall any case with amyloid disease. In looking over the postmortem records for the last fifteen years at the Children's Hospital, I have observed that amyloid disease is distinctly rare.

In conclusion, I base my diagnosis of amyloid disease in this case on:—

(1) The history of the case, a child with two tuberculous sinuses which have continuously discharged for at least four and a half years.

(2) Albumin and many tube casts in the urine.

(3) Enlargement of the spleen.

(4) The gradual progressive enlargement of the liver, until finally it has reached its present enormous size, with its smooth surface, firm consistency and rounded edges. (Discussion, page 861.)

Milk and Tuberculosis.—Marchand (*Le Nord Médical*) refers to the work of various modern investigators in this subject. A number of authorities, including Calmette and Guérin, of the Pasteur Institute, have concluded that the principal portal of entry of tuberculosis into the organism is the intestine, and that this disease can be introduced by the ingestion of milk taken from tuberculous animals. Every infectious malady of the cow renders its milk dangerous to the health of the consumer. Even the food eaten by the cow influences the quality of its milk. But cooking the milk—sterilization, pasteurization, or boiling—distinctly modifies its constitution. Such a process tends to convert the lactose into caramel. A part of the albuminoid element it makes insoluble. It affects as well various salts contained in the milk, especially those necessary to the bony tissues of the newborn. Even if it kills the injurious microbes, it has, nevertheless, the disadvantage of destroying the natural digestive ferments which the milk contains, besides changing its taste. Recent investigations show that next to maternal milk normal raw milk from a healthy animal, and naturally sterile, offers the best conditions of alimentation for young children. It is also the best form for patients or old people. The writer calls attention to the importance of employing tuberculin in order to distinguish diseased animals from healthy ones. The greatest care should be taken to use the milk of healthy cows only.—*Medical Record*.

Value of Blood Examination.—Shaw (*British Medical Journal*, April 27, 1907) emphasizes the absolute necessity of resorting to blood examination, not only in doubtful cases, but as a matter of routine. He says that the value of positive findings can in no way be belittled by the frequent occurrence of negative ones.—*Journal of the American Medical Association*.

MATERNAL IMPRESSIONS WITH REPORT OF A CASE.*

BY J. TORRANCE RUGH, M.D.,

Philadelphia.

Orthopedic Surgeon to the Methodist Episcopal Hospital, Associate in
Orthopedic Surgery in the Jefferson Medical College, etc.

In the etiology of congenital malformations, the influence of impressions received by the mother during the period of pregnancy upon the developing embryo or fetus has always been a source of dispute. The subject belonging naturally to the realm of theory, opportunity has been afforded for writers to construct hypotheses to account for the condition. The difficulty acknowledged by all classes of writers has been to demonstrate a relationship between the assigned cause and the observed effect. The theories of arrested development and of mechanical interference by various agents and conditions are subscribed to by all, but it is freely admitted by even the most eminent that "there is much that is uncertain, obscure, dark" (Ballantyne); and the hope is expressed that light may ultimately be thrown upon the subject. No one would expect all-cases of these deformities to be due to the same cause, but great difficulty is oftentimes experienced in the attempt to trace the etiologic factors in a given case. From time immemorial, maternal impressions have been held to be a decided factor in these cases, and in point of fact it is the oldest theory of which we have record. In recent years there have arisen strong opponents to the contention, and the ground has been most thoroughly covered by both sides. In all reports of disputes, whether favoring or opposing, the writers unite in decrying to the pregnant woman the possibility of the influence, and this universal agreement is in itself a strong argument in favor of a tacit feeling that there may be something in it, after all. A writer in the *American Text-Book of Obstetrics* (p. 308) very aptly expresses the status of the case as follows:—"We must still regard the relation of cause and effect as largely an accidental coincidence, bearing in mind, however, the fact that, exceptionally, very profound emotion can and does, in some unknown manner, influence the growth and development of the fetus." The simple fact that the manner in which impressions act cannot be demonstrated

* Read at the meeting of the Philadelphia Pediatric Society, April 9, 1907.

is not a proof against their effect. "Those who believe in such impressions acknowledge their ignorance of the way in which such impressions act; but if we exclude from belief all that we do not understand, our minds will be kept within very narrow limits." (Parvin: *Science and Art of Obstetrics*.)

Fordyce Barker (*Gynecological Transactions*, 1886), in an elaborately prepared paper, reviewed the literature of the theory, and reached the conclusion that there was a causal relationship between the impression and the malformation, and that the evidence is sufficiently authentic "to make it as certain as any other fact which cannot be explained by science. Indeed," he continues, "in the light of all the evidence which has been accumulated on this point, it seems to me as reasonable to deny the occurrence of earthquakes because philosophy has not yet been able to give a satisfactory explanation of their cause."

In *Medical Classics* (N. Y.), August and October, 1888, E. C. Spitzka advocates very strongly the causal relationship of maternal impressions after reviewing extensively the literature of the subject up to that period. He had himself "been successively an opponent, then a sceptic and finally a firm believer in the truth of the doctrine of maternal impressions," and relates the incidents of his change of belief. He classifies these occurrences under three headings: "First, those in which there is no resemblance between the deformity and the impression to which it is attributed; second, those in which there is a superficial resemblance, and third, those in which there is an almost photographic reproduction of the mother's impression in the markings of the child." He then considers each class in detail and relates numerous instances occurring under each which are not to be accounted for satisfactorily by any other theory. In harmony with the broad-minded views of all scientific writers, he considers that while maternal impressions can be traced by the parents in almost every instance of malformation, yet it does not follow that there exists a causal relationship in every case, but such is undoubtedly true in certain ones. A recent communication from him finds him of the same opinion as quoted above, and he sees "no reason for altering the views expressed in that paper."

It is almost universally conceded that the chief obstacle to the final proof of the theory lies in the failure to demonstrate nerve connection between the mother and the fetus. Were this possible, all doubt would immediately disappear and the theory

would become a law. Investigations toward accomplishing this purpose are being carried out, and the day may not be far distant when the fact that the relationship which exists between mother and child is one of continuity and not merely contiguity will be absolutely demonstrated. In the *Archiv. für Gynekologie* (Berlin), Bd 77, H. 1. Leipmann publishes a careful and extensive review of the literature and the results of his own inquiry into the biology of the human placenta ("Zur Biologie der Menschlichen Placenta"). After considering the views of other writers, he states his belief that the placenta is not merely a filter, but is really a gland whose function it is to elaborate anti-substances, which are appropriated by the fetus to neutralize or combat injurious substances of autogenous, or exogenous, character, and details the basis of this belief. If such a theory is correct, it carries with it the possible inference of the presence of nerve fibres for the regulation of glandular action, and will likewise strengthen the idea of the causal relationship through the nervous system.*

Ireland (*Mental Afflictions of Children*) in considering the causes of idiocy and mental deficiency says of mental impressions: "There are sometimes other causes, such as hereditary tendencies . . . or drunkenness, . . . but it by no means follows that because we can indicate a predisposing cause, that the shock to the mother could not have been the exciting one. In many cases, however, fright is the only apparent cause. . . . In all ages women have believed that fright or extreme distress is dangerous to their offspring, causing weakness, deformities, or deafness, and I see no valid reason for denying that such influences during pregnancy may, in some cases, produce idiocy in the child of healthy parents, who would otherwise have been born free from mental deficiency." Among numerous instances he cites that "Baron Percy, a French military surgeon, observed that out of 92 children whose mothers had been exposed to the terrors of a tremendous cannonade at the siege of Landau in 1793, 16 died at the instant of birth, 33 languished from eight to ten months and then died, 8 became idiotic and died before the age

(* I have been informed from three different and independent sources that a French investigator has by a new process of staining demonstrated the presence of nerve fibres in the placenta, but, though a careful and thorough search of the literature has been made for the abstract or the original article, thus far I have been unable to find it.)

of five years, and 2 came into the world with numerous fractures of the bones of the limbs."* Such instances as these cannot be passed by as merely incidental, for they indicate strongly that impressions do in some cases influence the development of the fetus or child.

In the *Journal of the American Medical Association*, Vol. XLVIII., No. 4, Dr. E. T. Shelley publishes an article on "Superstition in Teratology with Especial Reference to the Theory of Impressionism," and endeavors to prove that the latter is but the continuation of the former, preserved mainly by the medical profession under the guise of scientific deductions.

It is not the purpose of this paper to review or comment in detail upon his publication, but one or two thoughts may be mentioned as quite pertinent to the subject. In the arguments combating the theory, Shelley assumes that all cases of malformation should be explained or that they are considered as explainable by the impression theory when such has never been claimed by any of its strongest advocates. Almost all authors recognize the possibility of the occurrence, but also agree that it very seldom does occur. Ballantyne (quoted by Shelley) mentions several causes as possibly acting to produce the deformities, and then admits that it is all wrapped in uncertainty, and hopes for light. Furthermore, to claim that because malformations have not resulted in many instances where the mother has received a profound impression, therefore they do not occur in other similar cases, is an argument incapable of being sustained and is of no value whatsoever in the consideration of the theory. The human body, and especially its nervous system, is an unknown quantity, and this fact must always enter into every question. Charcot first conducted the well-known experiment of placing a hysterical or impressionable patient by the side of one who had some visible lesion of disease and noting that a similar condition was very soon produced in the hysterical one, but he did not reason that all hysterical or impressionable patients would react similarly. To reason so would have been the height of absurdity. In other words, because certain conditions are noted in one patient, it does not follow that they will also be noted in another one suffering from the same condition or placed under like circumstances.

Lastly, the thought that the theory makes the mother herself

* Similar observations were made by the French obstetricians after the siege of Paris in 1871.

responsible for the marking or malformation of her child either insinuates that the impression is a voluntary one on her part, which idea could not for a moment be entertained by either side to the discussion, or concludes that though it has been involuntarily received and has exerted its effects upon her nervous organism entirely independent of her control, yet is the fault her own, because the nervous system belongs to, and is a part of, her. This reasoning is likewise fallacious, and though every physician recognizes and deprecates the deleterious effects of the idea of mal-impressions upon the prospective mother, like many other unpleasant theories and facts in medicine, they are incapable of disproof and hence must be either acknowledged or tolerated as a necessary evil. There is no doubt in the minds of all that the great majority of instances, which necessarily originate with the laity, are remnants of superstition, but that there are some cases in which the cause and effect are too similar to be regarded as merely coincident. Such a case came under my observation recently, and while not posing as an ardent advocate of the theory of maternal impressions, yet I cannot but feel that in rare instances it is an etiological factor.

The case is that of a boy, now six years of age, and the history is as follows: The family history is entirely negative as to deformities or any constitutional diseases. The father is a physician who has always enjoyed good health and is in the active practice of his profession in a city in Pennsylvania. The mother gives a similar history of health and freedom from any deformity either congenital or acquired or of acquired or inherited disease. Her menstrual life has always been irregular. There are four children in the family, and three are normal in every respect. The fourth one, the patient, is the second child, and when born his hands were found to possess only the thumbs, index and second fingers, the others with their metacarpals being absent. On the right hand the index and second fingers are free and normal, while in the left hand they are webbed throughout their length (Fig. 1). (Since this picture was taken the fingers have been separated by operation.) There are absolutely no other evidences of defect about him either physical or mental, and his development is proceeding in a normal manner. The incident which was looked upon by the parents as the etiological factor in the deformity, and which was very clearly recalled to mind, was as follows: Mr. R., who was a very intimate friend of the

mother since her earliest girlhood and a patient of the doctor, was wounded on the ulnar side of the left hand in the Civil War. The third and fourth fingers were flexed for twenty years as a result of the injury. Following overuse of the hand, an abscess de-



FIGURE 1.

veloped in the metacarpals of these fingers with extensive destruction of the bony tissue, necessitating amputation of the affected part, which involved the third and fourth fingers with their metacarpals (Fig. 2). Complete recovery took place, as shown in the photograph, but the mother, intimate though they had been, never knew of the amputation of the fingers until in the fall of



FIGURE 2.

1900. On a certain day Mr. R. called on the doctor, who was out, and, in sitting down to write a note, he rested his left hand carelessly on the table. The doctor's wife entered the room from behind him, and walking over to his chair was shocked to note the loss of his fingers. She said nothing to him, but talked so

much of it to her husband in the following two or three weeks that he became rather provoked. Though, at the time of seeing Mr. R., she had missed her period by two weeks, she attached no significance to it, as her menstrual life had always been irregular. When the flow was not established at the end of two weeks more (two months) she discovered that she was pregnant and entirely lost sight of the hand incident until the birth of the child. Pregnancy and birth were normal. It is constantly contended by the advocates of the theory that the impression must be received between the fourth and the sixth week of pregnancy, and it is asserted by those who deny the influence that the impressions are never received at this period of gestation. In the present case, pregnancy had advanced to about the sixth week, although the mother was not aware of her condition because of the irregularity of her periods. She did not think of the child being marked even after she found herself pregnant, as neither parent is given to superstition, nor did the possibility of the condition occur to her, so that the impression must have produced its effects at the time.

A case reported by Dr. A. D. Whiting, of this city (*University Medical Magazine*, February, 1897), shows very clearly, however, that impressions received later may influence the child. This mother was at full term of her pregnancy and expected labor at any moment. She was severely burned and was brought to the German Hospital. The child was alive when she was admitted and was born nine hours later, though it was dead by this time and could not be resuscitated. "The child presented fresh-looking blebs on the legs, arms and face, and extensive blisters on the back, the back of the thighs and the scrotum, the parts affected corresponding to a marked degree to the burned areas of the mother." Whiting also cites two similar cases from Keating's Encyclopedia in which burns to the mother were reproduced in the child, pointing very strongly to the possibility and extreme probability of the effects of impressions received after the first six weeks of pregnancy. The multiplication of cases from bona-fide sources is unnecessary. The testimony of leading medical men in the past centuries favors the theory, and the leading obstetricians at the present day refuse to deny even if they do not subscribe to it. It is opposed by the teratologists, but they fail to disprove the arguments or to offer another theory that will prove a better substitute. The profession is unanimous

in its purpose to discredit to the pregnant woman the possible influence of such impressions upon her developing child, but within its own realms there cannot but remain the feeling that the truth has not yet been definitely determined. Call it what we may, theory, hypothesis or fact, there is no valid reason yet advanced why, after an existence of four thousand years or longer, it should be relegated to the lumber room of superstition in favor of some recently promulgated theories which have not been shown to be any more plausible and which have no more substantial foundation in fact. (The discussion will be found on page 864.)

Backward and Defective Children.—H. Shoemaker (*New York Medical Journal*, May 18, 1907) has examined many pupils during the last three years in public and parochial schools and considers that the greatest possible relief would come to them by the adoption of the following rules: First, the relief of all physical defects so far as possible. Second, placing a teacher in charge of a limited number of children. Third, in compelling a home report, from personal observation of the teacher in charge of the actual work, in order that cruelties and neglect may receive proper investigation, or that a teacher may not unwittingly be trying to force an infant mind. Fourth, in making the session shorter. Fifth, in demanding a concession from the parents, which may be implied by admission to the special class, for the correction of all physical defects in their children. Sixth, the employment of manual training, which may create dexterity, even though the power to originate is lacking. Seventh, physical culture and outdoor gymnastics, when possible.—*Medical Record*.

Ferments in the Urine of the Child.—Angiola Borrino (*Rivista di Clinica Pediatrica*, December, 1906) has made examinations of the urine of healthy children from a few days old to twelve years of age to determine whether the ferments of the gastrointestinal system—pepsin and trypsin—are to be found in the urine. Both are known to be found in the urine of adults. The author finds that a ferment analogous to pepsin is found in the urine of children of all ages, while a ferment analogous to trypsin seems to be absent. Uropepsin is found in nursing babies and the newborn. Other authors have found it in the stomach of the fetus.—*Medical Record*.

THE INDICATIONS FOR AND THE TECHNIQUE OF PARACENTESIS OF THE DRUM MEMBRANE.*

BY JOHN McCOY, M.D.,

New York.

Anatomical Considerations.—For an intelligent understanding of the causes and effects of suppuration of the middle ear, it is absolutely essential to have a comprehensive knowledge of the

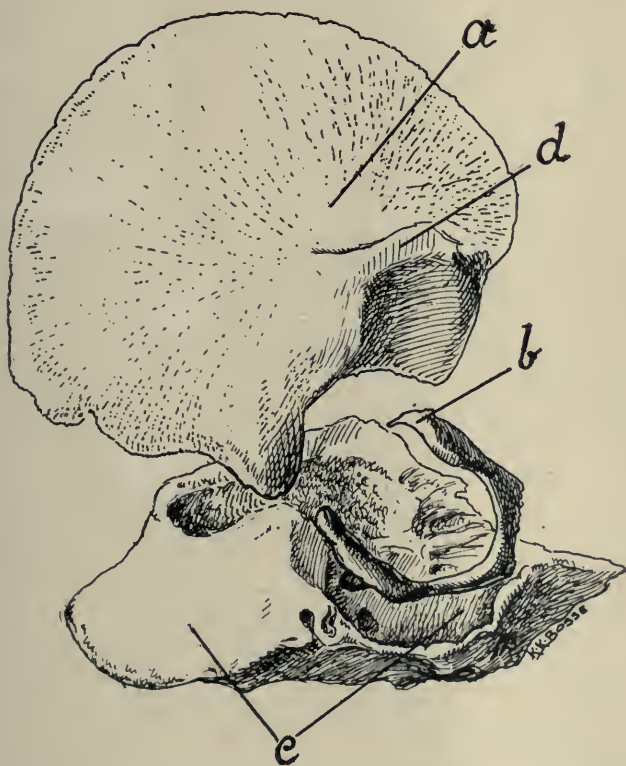


FIG. 1.—*a.* Squamous portion. *b.* Auditory or tympanic ring. *c.* Petromastoid portion. *d.* Zygomatic process. (Illustration twice natural size)

anatomy of this region. For this reason it is my purpose to outline as briefly as I can the somewhat complicated process by which the anatomy of this region is developed. The temporal

* Read before the Section on Pediatrics, New York Academy of Medicine, March, 1917.

bone develops from four centers, three of which are of vital interest to us at present. These three are the squamous center, the petromastoid center, and the auditory center. In the first place the squamous center develops into a flat osseous scale which has a ridge on its outer surface. This ridge later becomes the zygomatic process (see Fig. 1). The squamous plate next divides

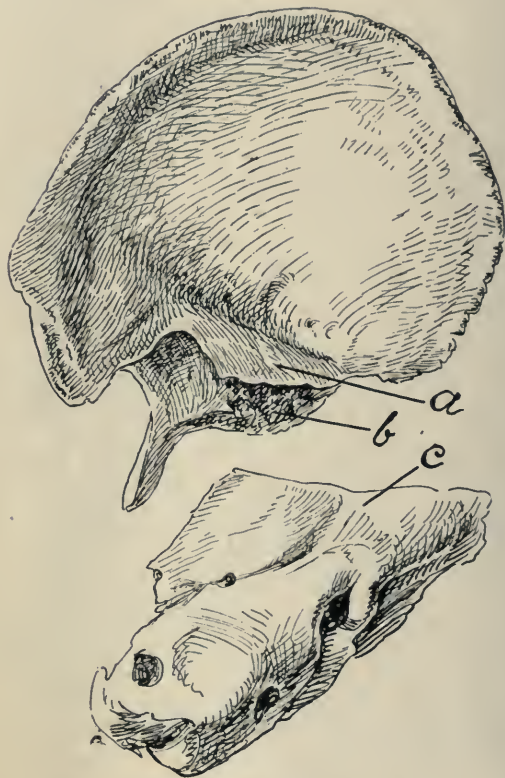


FIG. 2A.—*a*. Internal lamella of squamous plate. *b*. External lamella of squamous plate. *c*. Petrous portion. (Illustration twice natural size.)

into two lamellae of bone, an inner and an outer, the inner of which passes horizontally inward to form the roof of the tympanic or middle-ear cavity and of the mastoid antrum, and then joins the petrous portion at the petrosquamous suture (see Figs. 2 a and 2 b). The external lamella passes directly downward and at its lower border forms a deep notch (see Fig. 3). The second,

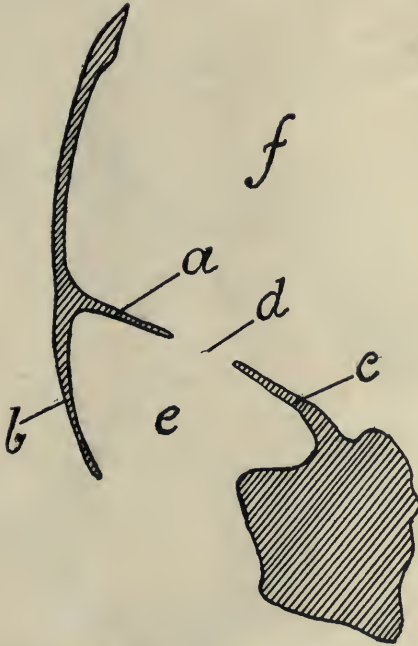


FIG. 2B.—*a.* Internal lamella of squamous plate. *b.* External lamella of squamous plate. *c.* Petrous portion. *d.* Petrosquamous suture. *e.* Middle-ear cavity. *f.* Brain cavity. (Illustration schematic.)



FIG. 3.—*a.* Notch at lower border of external lamella of squamous plate. *b.* Internal lamella. *c.* External lamella. (Illustration twice natural size.)

or tympanic, center develops into an oval strip of bone, called the tympanic ring, the upper portion of which is wanting (see

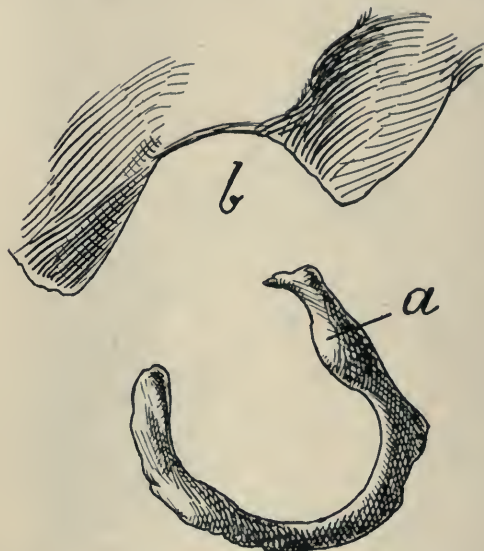


FIG. 4.—*a*. Tympanic ring incomplete in upper portion. *b*. Notch at lower border of external lamella of squamous portion. (Illustration three times natural size.)

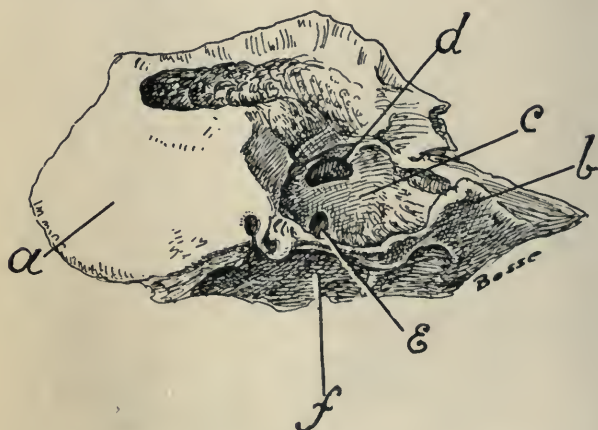


FIG. 5.—*a*. Outer surface of mastoid process. *b*. Petrous portion. *c*. Internal wall of middle ear. *d*. Oval window. *e*. Round window. *f*. Jugular bulb. (Illustration twice natural size.)

Fig. 4). This oval unites with the notch of the squamous portion and forms a complete ring. The inner circumference of

the oval or tympanic ring is grooved for the reception of the fibrous layer of the drum membrane. The third center develops into the petromastoid portion. It is an oblique triangular osseous pyramid with the apex directed forward and inward and the base formed by the outer surface of the mastoid process and that portion of the petrous bone lying below the petrosquamous suture. This last corresponds to the inner wall of the tympanic or middle-ear cavity (see Fig. 5). We have now seen how the component parts of the middle-ear structure are formed. We have further seen how the tympanic ring is grooved for the reception

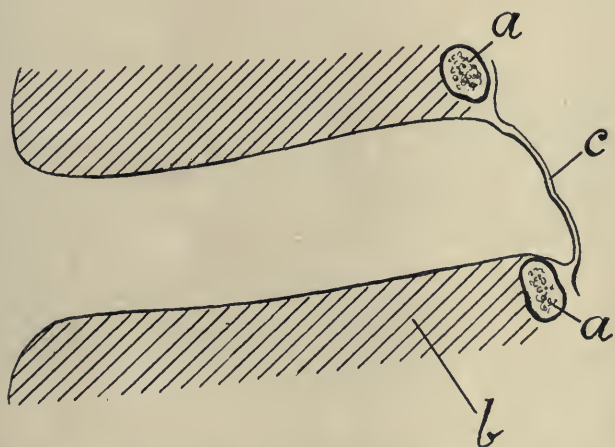


FIG. 6A.—*a.* Tympanic ring. *b.* Cartilaginous external auditory canal in infant. *c.* Tympanic or drum membrane. (Illustration schematic.)

of the drum membrane. Later we shall consider the structure of this membrane more in detail. The external auditory canal in the infant is simply a fibrous canal attached directly to the tympanic ring. From the tympanic ring outward grows the bony auditory canal. Hence we arrive at a point of practical importance, which is, that in the examination of infants' ears the external canal is quite straight and we can look through it directly at the drum. This is different in the adult. Then the bony canal has developed and we have an arrangement somewhat similar to that which appears in Figs. 6 a and 6 b.

If we now consider the tympanic or middle-ear cavity more in detail we shall find that it is very irregular in shape, but it

may be said to have a roof, a floor, an anterior wall, a posterior wall, an internal wall and an external wall.

The roof, or vault, is formed, as we have seen, by the osseous lamina of the squama, and has lying above it a portion of the brain of the middle fossa. In infants the petrosquamous suture is still patent and there is an intimate relation of the blood vessels of the dura and of the middle ear. This now explains to us why so many infants manifest meningeal symptoms when they have suppuration in the middle ear, and why it is easy for them to develop meningitis.

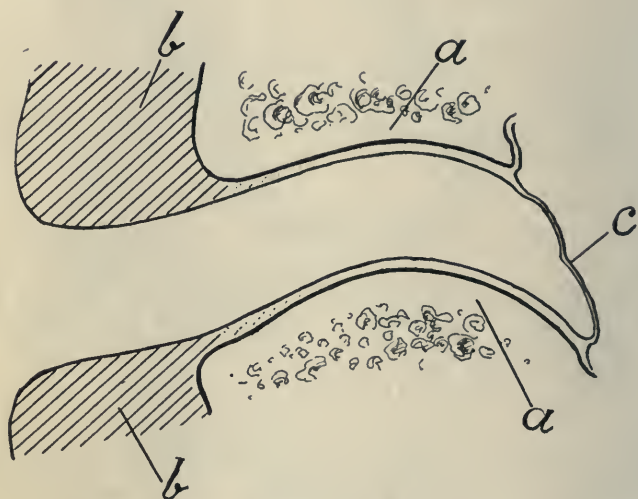


FIG. 6B.—*a.* Bony external auditory canal (adult). *b.* Cartilaginous external auditory canal. *c.* Tympanic or drum membrane. (Illustration schematic.)

The floor is narrower than the roof and no important structure is contained thereon, but just below it is the jugular bulb, and this sometimes encroaches on and projects up into the floor.

The anterior wall contains the bony orifice of the eustachian tube, and, situated just in front of this wall, is the carotid artery, which is separated from the middle ear by a thin, bony shell.

The posterior wall contains no structure of interest to us at present. The internal wall, however, has several points of interest. From above downward they are:—

- (1) The bony ridge of the facial canal, containing the facial

nerve. This ridge runs backward across the upper level of the internal wall. In the child the bony ridge is sometimes deficient, thus exposing the facial nerve. This explains to us why we sometimes get facial paralysis as a result of suppuration in the middle ear of children.

(2) Below this is the oval window, in which rests the foot plate of the stapes and which forms the entrance to the vestibule of the internal ear.

(3) Below the oval window is the promontory which corresponds to the first turn of the cochlea.

(4) Below the promontory is the round window, which is an entrance to the cochlea and which is a counterpoise for pressure at the oval window.

The external wall is formed by the membrana tympani, or drum membrane. As we look at the drum membrane we see that in its lower three-fourths it is composed of a tense, shining membrane, and that in its upper fourth it is a relaxed or loose fold, having a dull gray appearance. The lower three-fourths are composed of three layers of membrane, the outer one of which is a dermal layer continuous with the derma of the external auditory canal. The middle one is a fibrous layer, and it is this layer which fits into the groove in the inner circumference of the tympanic ring. This layer does not enter into the formation of the upper fourth of the drum. The internal layer is a mucous-membrane layer, and is continuous with the mucous membrane of the middle ear. The upper fourth, or relaxed part of the drum membrane, called Schrapnell's membrane, is composed of only two layers, namely, the external dermal layer, and the internal mucous-membrane layer. Attached to the drum in its tense portion, and occupying a vertical position, are the short process and the manubrium or handle of the malleus. These are to be seen at about the middle vertical line of the drum. The short process appears as a prominent white projection about the size of a small pin head, and is seen at the junction of the upper relaxed with the lower tense membrane. Descending vertically from the short process and inclining inward is the manubrium or handle of the malleus, at the lowest extremity of which is the most concave portion of the drum. At the anterior inferior quadrant of the drum, from the tip of the manubrium to the circumference of the drum, the membrane bows out convexly, and gives us a bright

light reflex at this portion. To recapitulate then, the following are the points we must look for, and which must obtain, in a normal drum:—

- (1) A lustrous pearl-gray, slightly concave membrane.
- (2) A bright reflex of light at the anterior inferior quadrant of this membrane.
- (3) A prominent white projection about the size of a small pin head situated in the center of the upper portion of the drum.
- (4) Two whitish bands running from this prominent white spot in a horizontal direction, one to the anterior circumference and the other to the posterior circumference of the drum. These are known as the anterior and posterior folds and mark the dividing line between the relaxed and the tense portions of the drum.

Pathological Considerations.—If we now consider the pathological processes which affect the middle ear, we shall find that, aside from traumatic rupture of the drum and infection of the middle ear from the external auditory canal, a contingency which does not concern us tonight, the cause which leads in the great majority of cases to a suppurative inflammation of the middle-ear cavity is an extension of an inflammatory process from the nose or pharynx through the eustachian tube. Occasionally, however, the inflammation in the middle ear is primary. It has been demonstrated that streptococci are found in the healthy middle ear.

The diseased conditions which conduce to an involvement of the middle ear through the eustachian tube are such as occur in the course of any of the exanthemata, especially of scarlatina, diphtheria, measles, pneumonia and influenza. It frequently follows the ordinary catarrhal cold, and it may follow the introduction of fluids through the nose into the eustachian tube.

The presence of pathological adenoids and tonsils, by inducing a chronic congestion of the eustachian tube and consequently a diminished resistance of its membrane, makes infection along this route very easy and frequent.

If we now follow the changes to be seen in the drum membrane from the inception of the inflammatory process to the time when it becomes necessary to incise it, we shall see in sequence: first, that the drum is losing its luster. Following this we see a congestion taking place in the upper relaxed portion of the

drum and gradually spreading over the whole drum. Following this we notice a slight bulging outward, usually in the upper posterior portion of the drum. It is then time to incise it.

In examining an ear for this condition it is well to bear several points in mind. These are:—

(1) In infants the auricle should be drawn downward and backward to separate the inferior from the superior wall of the meatus. In older children the auricle should be drawn upward and backward.

(2) We should be prepared with an applicator and cotton to remove particles either of wax or dead epithelium or medications, such as oil or other substances, that may have been introduced into the canal.

(3) We should remember that instead of seeing a red bulging drum we may see a drum of a dull whitish-gray color. This is due to necrosis of the epithelium of the dermal layer of the drum, and if this is gently swabbed it will come away and reveal the congested drum beneath.

(4) It is always well to examine both ears. As for subjective symptoms of ear trouble, many children give none whatever. Earache, which is commonly regarded as the most common subjective symptom of middle-ear inflammation, is frequently produced by decayed teeth, without any change in the ear whatsoever. Fever is really the only constant symptom, and in the absence of all other physical signs to explain it the ears should always be examined. An examination of the ears at regular intervals should be practiced in every case of acute infectious disease.

Paracentesis.—Prior to opening the ear drum, the external auditory canal should be sterilized by irrigation with 1-2,000 bichlorid solution, the hands should be sterilized, and the instruments should be boiled. It is well to have a clean glass slide ready for the purpose of taking a smear of the pus when the incision is made, so that we may have a bacteriological examination made and in this way determine the predominating micro-organism causing the infection. To infants it is best not to give an anesthetic. To older children nitrous oxide gas is very safe and efficient.

When all these preparations have been made the incision in the drum should be made in the following manner: Beginning

at the lower posterior segment we should plunge a small straight, or slightly curved knife into the membrane, and this should then be carried directly up to the superior margin of the drum; and, in withdrawing, the incision should be carried outward and backward for about an eighth of an inch. In this way we give free drainage to the whole cavity; the loss of blood and fluid relieves pressure and pain; more rapid healing of the cut surfaces ensues than if a small opening be made or a spontaneous perforation is allowed to take place; and, finally, it minimizes the chances of a mastoid involvement.

The dangers of paracentesis are that if too much force be used, or if the operator does not know the direction in which his knife is cutting, he may enter some of the structures already enumerated. Cases have been reported where the jugular bulb, the carotid artery, or the internal ear has been entered.

In conclusion, the writer would say that when the above enumerated indications obtain, then an early and thorough paracentesis will best conserve our patients' welfare.

Discussion, page 857.

157 West 73d Street.

Injuries to the Child's Head During Labor.—Sachs (*Boston Medical and Surgical Journal*) warns the obstetrician that, other things being equal and, above all, the life of the mother not being in danger, it is wise to curtail the period of labor as much as possible, and not necessarily to wait until the child's heart action becomes feeble. Many children might have escaped epilepsy, idiocy and paralysis if the period of labor had been properly managed. He is firmly convinced that protracted labor is the most powerful factor in producing epilepsy, idiocy, or paralysis in the newborn; one or often all of them are developed, and may be due to conditions present at the time of birth. He further says that the medical men in attendance at confinements have for years followed a policy of indifference toward the welfare of the child, and have allowed too many children to be born into the world after labor unnecessarily prolonged and in conditions that are a distinct disadvantage to society and to the individuals for the entire period of their natural lives.—*New York Medical Journal*.

HEMORRHAGIC TYPHOID FEVER, WITH THE REPORT OF TWO CASES OCCURRING IN CHILDREN.*

BY W. WELLINGTON WOODWARD, A.B., M.D.,
Resident Physician to Episcopal Hospital, Philadelphia.

Hemorrhage from the bowel in typhoid fever is a well-recognized and much-dreaded complication, dreaded especially on account of its frequency, its inadequate treatment and its consequently dire results.

Epistaxis also is of common occurrence; in fact, so common that it is classed by many writers among the more important indications of typhoid fever, although personally I do not believe that a frank hemorrhage from the nose occurs so frequently as many text-books would lead one to believe. In looking over a series of records in the Episcopal Hospital of this city, I find that a little over 31 per cent. show nose bleed in the course of the illness.

Other single hemorrhages, as from the stomach,¹ tonsil² and ear,³ also occur in cases with no other such tendencies.

As for the hemorrhagic diathesis itself, of 6,000 cases reported by Cornet 6 were of the hemorrhagic type; Lieber Meister reports 3 in a series of 1,900 during the epidemic at Basle; Weil 1 in 150; Ouskow 4 out of 6,513, and Osler 1 in 829.

In a series of 140, the second case here reported is the only one that I have seen presenting sufficient of the features of this particular type to be so classified.

The predilection of this condition is for childhood and adolescence; it is very rare after maturity, but in a cursory glance at the subject I have found several⁴⁻⁵⁻⁶ instances of its occurrence during the third decade of life.

Recently I have seen a girl, aged twenty-two, who was brought to the hospital in a serious condition during the third week of typhoid fever. She had had several copious nose bleeds

* Read before the Philadelphia Pediatric Society, April 9, 1907.

since the beginning of her illness and on the twenty-third day had four intestinal hemorrhages, amounting in all to about 40 ounces; also profuse epistaxis. On the twenty-fifth day several patches of ecchymosis appeared on both arms and along the lower border of the ribs. She died on the succeeding day.

As a rule, this hemorrhagic tendency appears in those cases which otherwise run a mild course, and but seldom in the fulminating type, but its presence makes the prognosis much less favorable and demands the most thoughtful consideration. It may be noticed during the height of the disease or toward the end, and even in relapses when the initial infection was not thus complicated.

Zimmerman,⁷ of Louisville, recites the symptomatology as follows:—

First, epistaxis followed by bleeding from spongy gums; then petechiæ under the skin, sometimes extravasations of blood into subcutaneous tissues or into the large serous sacs. There may be meningeal or cerebral hemorrhage.

It is stated that bleeding from the urinary tract is practically never seen, but during the past few years hematuria⁸⁻⁹ is mentioned in the records of at least 2 cases, which is a comparatively high percentage. Hemoptysis is exceedingly unusual, while hematemesis is seen in a considerable number of cases. Pregnant women so afflicted invariably abort—the abortion followed by alarming hemorrhage.

Great doubt exists as to the etiology of this condition; it has been variously assigned to overcrowding, deficient nourishment, alcoholism, scorbutic states and to the predisposition of youth; but if these be the causal factors, why do we not see more cases presenting such features in every-day hospital practice?

It is more satisfactorily explained by Trousseau, who thought it to be due to an altered state of the blood in which the coagulability was deficient. This was demonstrated in Osler's case at Johns Hopkins, where it was found that during the hemorrhages the coagulation time of the blood was increased from four to ten minutes.

As to the treatment, I have been unable to find anything strikingly new and have nothing to suggest, so I shall not review this section of the subject.

CASE I. D. W., age eleven, a school-girl of healthy parentage,

was admitted on the eighth day of illness to the service of Dr. D. J. Milton Miller, in the ward of the Episcopal Hospital, Philadelphia, with the following history: Patient had the usual diseases of childhood. She states that she had typhoid fever some years before, but can give no positive data concerning it. Otherwise she has enjoyed the best of health. The present illness began seven days ago with headache and emesis, vomiting all food, especially milk; no pain, epistaxis or diarrhea.

Physical Examination.—Face decidedly flushed, lips parched and red, no herpes; tongue is dry and heavily coated in the center, red on the edges. No organic lesion of heart or lungs. Abdomen shows no distention, tympany or tenderness. Few typical rose spots are present. Liver dullness normal. The spleen is not palpable, but is enlarged on percussion.

Leukocyte count, 5,000; Widal reaction, positive; uranalysis, negative.

The patient's condition remained unchanged until February 27th, the twelfth day of the disease, when she complained of sore throat and had slight cough. On this day, too, the number of rose spots was greatly increased. Two days following, another count of the leukocytes was made with a result of 6,600, and a positive Widal reaction was obtained for the second time. On this date also she had a copious nose bleed.

On the twenty-second day she lost about 2 drams of blood from her nose and for the first time there was bleeding from the gums, which were now spongy. A marked cardiac murmur, systolic in time, was heard at the base and faintly at the apex. This was in all probability hemic.

In a few days the scorbutic condition of the gums disappeared, but on the twenty-ninth day there was another copious nose bleed; at this, for the first time, there was a drop in temperature (103° - 99° F.) coincident with the bleeding.

On two occasions afterward the patient spat up about a dram of bright-red blood, interesting on account of the rarity of hemoptysis.

Purpuric spots occurred from time to time on various parts of the body surface.

The patient was extremely emaciated and anemic, but from this time on passed through an uneventful convalescence to complete recovery. Strangely enough, she returned to the hospital

two years later with a diagnosis of typhoid fever, but this time the disease ran its course without complication.*

CASE II. The second case did not terminate with the same happy result as the one just cited. This patient, E. S., age seven years, a school-girl also of a healthy family, was admitted to the Episcopal Hospital February 5, 1907, on the fourth day of the disease.

There was no history of previous ill health. The mother stated that three days before admission her child complained of headache, seemed very tired, refused all food, was restless and did not sleep. The following day she vomited some yellow liquid material containing blood. At first she had no diarrhea, but for two days had been having frequent liquid stools.

On admission: Temperature, 104° ; pulse, 144; respiration, 36. Patient was restless, and at times quite delirious. During rational intervals complained of abdominal pain and excessive thirst.

Examination showed a well-nourished child, with no cutaneous eruptions, excoriations, etc. Expression was apathetic, face decidedly flushed, pupils not dilated and reacting normally to light and accommodation. Lips red and dry; no herpes or coryza. Tongue was dry and heavily coated, the papillæ red and prominent, suggesting the strawberry tongue. Throat was somewhat congested, but otherwise clear. Heart and lungs were normal. Abdomen was decidedly distended and tympanic. No rose spots. Liver outlines were normal, while the spleen was slightly enlarged to percussion.

Leukocyte count, 16,200; Widal reaction, negative.

Urine.—Specific gravity, 1.030; reaction, acid; small amount of albumin, but no sugar; few hyalin and pale granular casts; many white, but no red, blood corpuscles.

Stool was liquid in consistency, brown in color, and contained considerable mucus but no macroscopic blood.

All nourishment was vomited for several days. The temperature ranged between 102° and 104° until February 9th, the eighth day of the disease, when there was a drop to 99.4° , followed on

* During her second visit to the hospital, this patient presented practically no symptoms of typhoid fever other than pyrexia and a positive Widal.

the next day by a rise of 3° and the appearance of a copious crop of typical rose spots.

The tympany gradually disappeared; there was no more emesis; the temperature ran an irregular course, but the patient's condition was satisfactory until the fourteenth day, when the fever rose to 104° and the child complained of earache. The tympanum was slightly congested, but there was no bulging.

The day following there was considerable bleeding from the nasal and anal mucous membranes; the gums, however, were not markedly spongy.

On the sixteenth day there appeared several ecchymotic spots on the arms, legs and back along the vertebræ, and bleeding from small ulcers at the anus and vagina. The anal mucous membrane was blue and congested and the hemorrhoidal veins distended. There was also present at this time a superficial bleeding ulcer on the scalp, which soon became purulent. The hair was at once shaved off and the ulcer treated with wet bichlorid dressings, but, notwithstanding this, erysipelas of the scalp and face developed.

Another blood count was made with the following result: Leukocytes, 18,800; erythrocytes, 3,888,000; hemoglobin, 70 per cent; and now for the first time a positive Widal reaction was obtained, confirmed by a second after the lapse of a few days.

The next bleeding was from fissures on opposing surfaces of the knees, and purpuric spots appeared upon the forehead.

On the seventeenth and eighteenth days there were greenish-black stools of tarry consistence. No blood corpuscles were visible under the microscope, but the Guaiac test for occult blood gave a positive result.

The urine was repeatedly examined throughout the course of this attack, but at no time was hematuria present.

February 18th the temperature went from 100° to 104° . From this time there was a gradual fall to normal, where it remained for two days, until death. At no period was the temperature sub-normal.

February 24th the little sufferer suddenly became cyanosed; breathing-rate at first rapid and later slow until death.

The treatment throughout the course of the illness was symptomatic.

The autopsy confirmed the diagnosis by the presence of ulcers

of the Peyer's patches in the stage of healing, and demonstrated congestion of all the organs except the lungs, which were markedly anemic.

The right auricle of the heart was dilated and the ventricle contained an antemortem clot with branches extending into the pulmonary vessels. Otherwise the heart was normal.

The remaining notes on the autopsy reveal nothing of special interest. (The discussion will be found on page 863.)

REFERENCES.

1. Ferguson. "Hematemesis in Typhoid Fever." *Intercolon. Medical Journal*, Melbourne, Australia, 1906, Vol. XI.
 2. Lederman. "Tonsillar Bleeding in Typhoid Fever." *Louisville Monthly Journal of Medicine and Surgery*, 1904-1905, Vol. XI.
 3. Since beginning the preparation of this paper, my colleague Dr. Erick von Buddenbrock had a case in his ward with a hemorrhage from the middle ear with no previous indication of bleeding anywhere or otitis media.
 4. J. R. Durham. "A Case of Hemorrhagic Typhoid Fever in a Man Aged Twenty-eight." *Journal of American Medical Association*, December, 1904, Vol. XLIII.
 - 5-7. B. F. Zimmerman. "Hemorrhagic Typhoid Fever." *Louisville Monthly Journal of Medicine and Surgery*, 1904-1905, Vol. XI.
 - 6-8. David Blair. "Hemorrhagic Typhoid Fever." *London Lancet*, 1905, Vol. I.
 9. Marion Hull. "Hemorrhagic Typhoid Fever with Report of Case." *PEDIATRICS*, N. Y., 1905, Vol. XVII.
 - Molyneux. "Hemorrhagic Typhoid Fever with Perforation in Ascending Colon." *British Medical Journal*, London, 1906, Vol. II.
 - Osler. *Practice of Medicine*.
 - Barlow. "Purpura in Typhoid Fever." *London Lancet*, 1884.
 - Koenig. "Hemorrhage from All the Mucous Surfaces in a Case of Typhoid Fever." *Medical Records of Chicago*, 1893.
-

Oatmeal for Children.—Some investigations made by Watson (*British Medical Journal*, April 27, 1907) appear to show that an excessive oatmeal diet, in the form of porridge and milk, has a markedly stimulating effect on the thyroid gland of young animals. He thinks that there is no reason to doubt that a more moderate and more physiologic use of the same food would be followed by a stimulation in a degree which would be wholly beneficial. Further, he says that in these facts may be found the explanation of the value of oatmeal in the dietary of young children.—*Journal of the American Medical Association*.

ARCHIVES OF PEDIATRICS.

NOVEMBER, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

ROYAL STORRS HAYNES, Ph.B., M.D.,

ASSOCIATE EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

President and Treasurer, E. B. Treat; Secretary, E. C. Treat.

Contributors and Correspondents, see page III.

HARMFULNESS OF THE RUBBER "COMFORTER."

An observer who makes a visit to any large clinic for infants will be struck with two things as he looks over the crowd of patients awaiting their turn—first, that the mothers are, most of them, walking about and shaking their babies up and down instead of sitting restfully on the seats provided; and, second, that nearly every baby has a "comforter," or "pacifier," in its mouth. Human nature is much the same everywhere, so no doubt the same practices could be observed in Russia or China,

wherever mothers meet with their babies. Of course, the reason both for the jouncing of the infant and for stopping its mouth with rubber is the same—to keep the baby quiet, or, at least, from crying, at all costs.

It might be thought at first that such a widespread instinct on the part of the mothers must be a beneficial one. But there are several reasons why neither practice is a good one for the baby. As to the churning of the baby, or even rocking it back and forth, this motion is frequently sufficient to provoke regurgitation or vomiting of the churned-up milk; or if no such result occurs the baby's nervous system grows so accustomed to the rhythmic motion that it cannot be quiet without that form of stimulation—*i. e.*, the baby has become addicted to constant motion and is "nervous" and fretful without the customary excitation.

As to the "pacifier" habit, there is more serious objection. In the first place, the dummy nipple is apt to carry dirt infection to the infant's mouth from the floor, upon which it constantly falls, or from the shelf where it is kept, producing ulcerative stomatitis or tonsillitis.

Secondly, by stimulating constant sucking it promotes a steady secretion of saliva which in turn is constantly swallowed and, reaching the stomach, not only dilutes the gastric juice, but keeps up a peristalsis of that organ and promotes peristalsis throughout the whole alimentary tube. This increased peristalsis may result in vomiting, or, more often, in frequent movements of the bowels, particularly if the baby is already suffering from intestinal indigestion or enterocolitis. The "pacifier" should certainly never be permitted in cases of either vomiting or diarrhea, since its use aggravates these symptoms.

A third, and perhaps more serious, indictment against the "pacifier" is that, if used for a long period, it causes a deformity of the teeth and upper jaw. The premaxillary bones do not become firmly ossified to the superior maxillæ until after the age of five years, so that, aside from the softness of young bone, there

is great danger that the constant pressure of the nipple against the upper gum and incisor teeth, together with the atmospheric pressure on the lateral portions of the bones at the time of sucking, will change the shape of the face.

In the *British Medical Journal* of October 20, 1906, is an interesting article by Dr. T. F. Pedley on "The Rubber Teat and Deformities of the Jaws." Writing from Rangoon, he declares that the dummy nipple habit is exceedingly prevalent in Burmah, and that he has been struck with the deformities of the jaw and the faulty alignment of the teeth produced by the habit. He cites a number of cases and gives photographs of the jaws and of the teeth to show the lack of occlusion and the protrusion of the upper central incisors. Tonsillitis and adenoid hypertrophy are apt to supervene, and, by causing mouth breathing, to aggravate the deformity of the teeth.

For the above very good reasons the use of the "comforter," or "pacifier," should be prohibited, and weaning from the bottle should take place shortly after the end of the first year, the baby being taught to take its food from a cup or by spoon. Early in life good habits are as easily inculcated as those that are harmful.

COLLECTIVE INVESTIGATION OF ANTERIOR POLIOMYELITIS.

In order to study the present epidemic of this disease, one Committee has been appointed by the New York Neurological Society and another by the Section on Pediatrics of the New York Academy of Medicine. These two Committees will cooperate in the work and will have the valuable assistance of Dr. Flexner, of the Rockefeller Institute, and of Dr. Bolduan, representing the Department of Health of New York City. In order to obtain data for the study, the aid of those physicians who have seen cases in their private or hospital practice is earnestly solicited

in accordance with the following letter, which has been prepared by the Committee:—

COLLECTIVE INVESTIGATION OF THE POLIOMYELITIS EPIDEMIC OF THE YEAR 1907 BY THE COMMITTEE APPOINTED BY THE NEW YORK NEUROLOGICAL SOCIETY, WITH THE COOPERATION OF THE COMMITTEE APPOINTED BY THE SECTION ON PEDIATRICS OF THE NEW YORK ACADEMY OF MEDICINE.

The members of the Committees above mentioned are anxious to make a thorough investigation of, and to collect all the data relative to, the epidemic of Poliomyelitis of 1907 in New York City and its immediate vicinity. To this end they must have the co-operation of all those who have had, or will have, an opportunity of studying this disease in hospital or private practice. Physicians willing to assist in this work will kindly inform the Secretary, Dr. Edwin G. Zabriskie, 37 West Fifty-fourth Street, New York City, who will send history forms so as to secure uniform records. Physicians who cannot collaborate with the Committee will confer a favor by reporting to the Secretary the number of cases of Poliomyelitis they have treated during the past six months.

The joint Committee wishes to state most emphatically that due credit will be given to everyone who contributes to this collective investigation, and that the publication of the Committee's report will in no wise interfere with any article or articles to be published on this subject. Moreover, the Committee's report will surely not be printed earlier than a year from date, so that medical men will have ample time to publish their articles long before the Committee will have its report ready.

Respectfully,

*The Committee of the Neuro-
logical Society:—*

B. SACHS, Chairman;
E. G. ZABRISKIE, Secretary;
J. R. HUNT,
J. F. TERRIBERRY,
L. PIERCE CLARK.

For the Rockefeller Institute:—

SIMON FLEXNER.

New York, October, 1907.

*The Committee of the Section on
Pediatrics of the New York
Academy of Medicine:—*

L. E. LA FÉTRA,
HERMAN SCHWARZ,
L. C. AGER.

*For the Department of Health,
New York City:—*

C. F. BOLDUAN.

Bibliography.

Treatment of Diseases of Children. By **Charles Gilmore Kerley, M.D.**, Professor of Diseases of Children, New York Polyclinic Medical School and Hospital, etc. Octavo volume of 597 pages, illustrated. Cloth, \$5 net; Half Morocco, \$6.50 net. Philadelphia and London: W. B. Saunders Company, 1907.

A book of good size devoted to the details of the newer methods of treatment of the diseases of children has been needed for some time. Dr. Kerley's work meets that need. The author has succeeded admirably in giving a clear presentation of the many details of therapeutic measures, particularly those other than drugs, in the treatment of the diseases of children. The scope and character of the book are indicated in the author's preface; the book has been written not to fulfill the needs of the specialist in children's diseases nor those of the undergraduate student, but for the general practitioner.

The work is not confined strictly to treatment. Brief descriptions of disease or disordered functions, together with illustrative cases, supplement the paragraphs on treatment under each condition. The opening chapters on obtaining the history and on the importance of giving written directions are particularly to be commended. Among other chapters worthy of mention are those on milk and its production, otitis, instructions for the summer, and the use of general therapeutic measures such as heat, cold enemata, anesthetics and climate. There is also a chapter on gymnastic therapeutics which makes available to the physician much that has been attainable heretofore only in works on orthopedics and medical gymnastics.

The book is a valuable addition to the literature on pediatrics, and will prove of great service to those for whom it was intended.

Diagnostics of Diseases of Children. By **LeGrand Kerr, M.D.**, Professor of Diseases of Children at the Brooklyn Postgraduate Medical School. Octavo of 542 pages, illustrated. Cloth, \$5 net; Half Morocco, \$6.50 net. Philadelphia and London: W. B. Saunders Company, 1907.

This work on the diagnostics of diseases of children has been

written for the general practitioner rather than for the specialist in pediatrics. The general plan of the book is to consider each region of the body in detail, giving first the normal conditions, then the study of abnormalities and a discussion of the various symptoms that arise in disease affecting the region.

It is in the discussion of the signs and symptoms met in the various regions that the book is strongest. The sections on vomiting, headache, convulsions and paralysis are especially good because of their classifications. In the discussion of symptoms the author rightly says that the condition of the tongue has little or no relation to the gastrointestinal tract. There are numerous illustrations in the book that assist in the understanding of the text, but the one used in the section on cretinism is hardly typical of the disease. In a work on diagnostics one might expect to find also some discussion of the differences between rickets, cretinism, chondrostrophy and mongolism.

The chapter on anemia also would be more valuable if there were a more detailed discussion of the blood changes. There is no mention of the pseudoleukemia of infants, nor is there any discussion of the value of leukocytosis and the changes in the proportions of the leukocytes, as obtained by differential count.

Woman in Girlhood—Wifehood—Motherhood. Her Responsibilities and her Duties at all Periods of Life. A Guide in the Maintenance of her own Health and that of her Children. By Myer Solis-Cohen, A.B., M.D., Instructor in Physical Diagnosis, University of Pennsylvania; Assistant Physician to the Philadelphia General Hospital, etc. Profusely illustrated with color plates, scientific drawings and half-tone engravings. Philadelphia: The John C. Winston Company.

Physicians are frequently asked to recommend to their patients some reliable book upon the subjects of the growing girl, the wife and the young mother. Dr. Myer Solis-Cohen has written such a book and one which can safely be recommended, since he has presented these important subjects in a popular manner but with due regard to scientific truth. The sections of the book are:

Part I.—Health and Beauty, in which are discussed the general care of the body, together with diet, work, rest and recreation.

Part II.—On the Woman, discusses the period of puberty, married life, pregnancy and menopause.

Part III.—Is devoted to Childbirth, and

Part IV.—To the Baby.

The advice given is sound, and careful attention is paid to the details of management and treatment of the various conditions discussed. A good glossary and index add greatly to the usefulness of the work. The illustrations are somewhat gaudy, designed doubtless to make the work "popular."

Tuttle on Diseases of Children. A Pocket Text-Book of Diseases of Children. By **George M. Tuttle, M.D.**, Attending Physician to St. Luke's Hospital, the Martha Parsons Hospital for Children and Bethesda Foundling Asylum, St. Louis, Mo.

New (second) edition, thoroughly revised. In one 12mo volume of 392 pages, with five plates. Cloth, \$1.50 net; flexible leather, \$2 net. Lea's Series of Pocket Text-Books, edited by Bern. B. Gallaudet, M.D. Philadelphia and New York: Lea Bros. & Co., 1907.

This second edition of Tuttle's Manual of Diseases of Children is a revision of the first edition published seven years ago. It has been brought up to date and is an excellent epitome of the subject. Treatment is given more careful consideration than is usual in such manuals.

An Aid in Eliciting the Patellar Reflex —There are some persons who do not seem capable of obeying the injunction to let their muscles "go loose" during a physical examination. To avoid the difficulty in an attempt to elicit the patellar reflex, Dr. W. Guttman (*Fortschritte der Medicin*, 1906, No. 29; *Berliner klinische Wochenschrift*, September 17) advises suspending the limb by means of two towels, one above the knee and the other below it, the upper towel so arranged as to make slight traction toward the trunk.—*New York Medical Journal*.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE.—SECTION ON PEDIATRICS.

Stated Meeting, March 14, 1907.

GODFREY R. PISEK, M.D., CHAIRMAN.

DR. HENRY W. FRAUENTHAL presented a case of Disease of the Right Sacroiliac Joint in a boy and showed X-Ray plates of a case of Multiple Exostoses.

ANGIONEUROTIC AND SOME OTHER EXAMPLES OF ESSENTIAL EDEMA IN CHILDREN.

DR. HERMAN SCHWARZ read a paper with this title. He mentioned some of the theories as to the causation of general and local edema. The 1st case he described was one of general edema following scarlet fever without any changes in the urine. The case was a mild infection, the temperature and rash perfectly typical. At the end of the first week temperature was almost normal. On the twelfth day of the disease edema of face and scrotum was noticed. This spread gradually until a general subcutaneous edema was present. The pleural and peritoneal cavities were not involved. The urine was normal. The edema remained about two weeks, followed by perfect recovery.

The 2d case he described was one of scarlet fever with occurrence of giant urticaria which simulated the edema of nephritis. Dr. Schwarz seemed to think that the large doses of quinin given for the temperature was the toxic factor in the production of the urticaria.

The 3d case was one of general edema in a six-weeks-old infant following erysipelas neonatorum.

The 4th case was one of general edema following gastroenteritis, and reported only because it seemed that the child was free from edema even though on a mixture of fennel tea and barley water for three weeks, and only (?) when put on a mixture of equal parts of milk and water, with a pinch of salt in each

bottle, did the edema begin to appear. Dr. Schwarz referred to the large amount of salt (about 80 grains a day) as a probable etiological factor in the production of the edema.

The 5th case reported by Dr. Schwarz was one of angioneurotic edema with several attacks of abdominal colic, and several attacks of edema of the glottis. He discussed the differential diagnosis between this affection and giant urticaria.

DR. ATTILO CACCINI reported the case of a girl of seven years, who in a few days developed general anascarca and died within two months without any kidney lesion so far as the urinary findings went. The blood examination showed: red cells, 7,000,000; hemoglobin, 120 per cent. He thought this case one of angioneurotic edema.

Dr. Caccini said that he now had under observation a boy of twelve years, a very intelligent but nervous lad. Since he was four years old he has had attacks of angioneurotic edema, in which he is extremely nervous and cannot sleep. He also has much itching, especially of the head, neck and chest. After two or three days lumps appear on his forehead, then all over his head, the lumps increasing gradually to the size of half an orange. Sometimes these lumps cover the whole face. Whenever he has the slightest illness, such as an attack of tonsillitis, this trouble will appear. In 1895 he had an attack of measles and, in 1906, another attack accompanied by this condition. The attacks come on even with slight disturbances, as of the intestines.

Dr. Caccini has seen another case of angioneurotic edema occurring in a boy who was taken sick suddenly with great dyspnea. Intubation and tracheotomy were tried, but the child died. At autopsy nothing could be found to account for the death of the boy except angioneurotic edema of the larynx.

DR. LOUIS C. AGER said that, as in both cases reported in the paper the so-called angioneurotic edema followed scarlet fever, he thought that there might be some kidney lesion to account for the edema.

He called attention to Dr. Cabot's long series of investigations in relation to urinary findings in various forms of nephritis and how careful one should be in excluding nephritis from negative urinary findings. A large number of those cases coming to autopsy showed kidney lesions when nothing was shown during life.

The next case reported by Dr. Schwarz he believed to be undoubtedly a septic one. Any reaction or mild infection in children under one year of age would produce all sorts of irritations of the skin.

In true angioneurotic edema there was apt to be eosinophilia, and this was usually due to intestinal intoxication of some kind. Dr. Ager believed that all of these cases must be of toxic nature.

DR. PISEK said that only the day before he had been called to see a case of primary edema of the lungs. The history was that the child had been taken acutely ill, had had dyspnea, and upon physical examination edema of the lungs had been found. He was given large doses of strychnin, but his life had been despaired of that night. The following day when Dr. Pisek saw him the laryngeal symptoms had cleared up, but the edema of the lungs remained. Adrenalin was given by the mouth with happy results.

DR. GEORGE D. SCOTT reported the case of a child with an acute bronchitis, with marked acute edema of the larynx following; the child quickly became moribund and died very suddenly.

DR. ELI LONG said that they had all seen edemas due to poor food; all marasmic children had it sooner or later. There were some cases seen in little children that were due to congenital specific disease and he did not know whether they should be called angioneurotic edema or not. He thought angioneurotic edema should be placed in a class by itself, where there was no causative factor.

He told of a case of a very young baby fed on condensed milk who had a marked general edema. There were no other evidences of inherited syphilis, though the parental history on the father's side was positive. On inunctions of mercury, the edema rapidly disappeared, while the feeding was unchanged.

DR. E. H. BARTLEY asked what was the distinction between angioneurotic edema and giant urticaria.

DR. SCHWARZ said he had tried to find whether there was any distinction between giant urticaria and angioneurotic edema. One point of distinction was that in spite of what one does for these patients the attacks come on. Angioneurotic edema is not usually associated with intestinal symptoms, but urticaria is. He said that Packard had mentioned a case of urticaria associated with

asthma. He could not find any reference to those violent attacks of colic, vomiting and diarrhea in angioneurotic edema that occurred in some forms of giant urticaria.

There were some forms in which no diagnosis could be made—the transitional forms—but in the typical cases they were much more serious than ordinary urticaria.

He could not make an absolute distinction between giant urticaria and angioneurotic edema; but in the former the attacks were almost always associated with violent abdominal symptoms.

Those light cases of edema following a gastroenteritis he believed to be quite common. With a change in the diet, they disappear very rapidly.

The cases mentioned he did not believe to be very common, especially the case of erysipelas neonatorum. In the case of enteritis treated by irrigations, the question was raised whether or not the salt solution might not have had some effect in the production of a nephritis.

DR. JOHN J. MCCOY read a paper on

THE INDICATIONS FOR AND THE TECHNIQUE OF PARACENTESIS OF
THE DRUM MEMBRANE.

(See page 831.)

This paper was discussed by Drs. Loughran, Ager, Schwarz, Hoag, Pisek and Long.

Hemorrhagic Complications of Scarlatina.—Klose, in discussing these complications as well as hemorrhagic conditions in children in general, states that he has found the treatment by the injection of gelatin solutions the most satisfactory. He usually employs a 10 per cent. solution and administers 20 c.c. at a time. For the site of injection he recommends the axillary region midway between the anterior and posterior axillary lines, which he says is also very well suited for the injection of diphtheria antitoxin. The skin in this situation is freely movable, and overlies a satisfactory cushion of fat and connective tissue, while lymphatic glands for absorption are close at hand. If the gelatin solution is carefully prepared the much dreaded danger of tetanus need not be apprehended.—*Medical Record.*

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, March 19, 1907.

J. W. VANDERSLICE, M.D., PRESIDENT.

A CASE OF TETANY.

DR. J. C. WEST presented the case of a child of six months who had been brought to him with the following history:—The family history was negative. The labor was normal, but at birth there was some swelling of the feet and ankles. At seven weeks there was an attack of convulsions, general in character, six or eight daily for a period of one week. Following this there was rather constant indigestion, with loose green stools containing mucus and curds. Three attacks of convulsions occurred subsequently, one at three months, one at five, and one ten days before the child was seen. These were in frequency, duration and severity similar to the first. The convulsions were tonic and general, although the left side seems to have been involved a little more than the right. They seem to have left the child weaker than before and he has never been able to hold his head erect. There has been no edema anywhere but in the feet and ankles.

Examination when seen showed a fairly well-nourished child of 14 pounds, negative in every way except that the heart action was at times irregular and the tones somewhat indistinct; both feet and ankles were edematous, the skin over them having the appearance of healthy skin, giving the impression that the skin had accommodated itself to the edema which had existed since birth.

Urine examinations were absolutely negative. Mother's milk showed 3 per cent. fat. Stools showed some undigested proteid and an abundance of fat. The blood was practically normal. In presenting the case Dr. West accounted for the convulsions by a chronic intestinal indigestion, but asked for a discussion of the cause of the edema, hesitating to beg the question by calling it idiopathic.

DR. S. J. WALKER said that the diagnosis of tetany was suggested to him by the position of the feet and of the fingers, the marked edema and the chronic indigestion. These characteristics

of tetany, the chronic course with the apparent improvement in the child's condition and the absence of convulsions for a few weeks, followed by the appearance of more acute symptoms, would explain the situation.

One other explanation suggested itself—injury at time of birth. The birth was a dry birth and the child large. Although seemingly born well, and crying immediately, yet the convulsions began at the age of seven weeks and the child is unable to hold its head up at six months.

DR. J. W. VANDERSLICE said that Dr. West at his first visit had the impression that the case was one of tetany. There were all the characteristics of the disease, but they tried to bring about a spasm of the facial muscles or a spasm of nerve trunks without success, and so no diagnosis was made. From his experience with the tetany, seven weeks was rather early for it to appear, but if the saying in Vienna be true, that everybody has it in April and May, perhaps children might have it before seven weeks if born the right time of year.

Dr. VanDerslice asked Dr. Walker what he thought of depending upon Chvostek's and Trousseau's signs for the diagnosis of these cases.

DR. WALKER said Chvostek's sign is not so constant as Trousseau's, but that he considered pressure on the nerve trunks and large vessels of value.

DR. WEST closed the discussion with the statement that tetany is possible, as chronic indigestion is cause enough to produce almost any kind of nervous trouble in a child, but it had not coincided with his previous experience in that disease. He concurred in the opinion that the edema and the convulsions have separate causes, and is unable to associate convulsions coming on seven weeks later with edema existing at birth in any causal relation.

In response to inquiries, Dr. West said that less edema was present now than at any time since his first examination, and that stiffness was noticed in the legs, particularly in the right, during convulsions.

DR. FRANK W. ALLIN presented a case of

CHOREA AND PSORIASIS WITH A HISTORY OF RHEUMATISM.

Florence M. is eleven years and ten months old, the sixth and youngest child of German parents.

The father died of alcoholism. The mother is living and well. She has had rheumatic pains, also some kidney trouble and eczema. The five other children are all well. Seven years ago one boy developed a rash all over the body, lasting two or three weeks, following blood-poisoning in the finger. An aunt is subject to frequent severe headaches, and a cousin had chorea eight years ago.

This child was always well as a baby. She had measles at three years of age, but none of the other diseases of childhood. When eight years of age she had an attack of quinsy. About this time also she suffered from rheumatism, with pains and some redness in both legs, without swelling. The attack lasted two or three weeks. She has tonsillitis and peritonsillar abscesses one or more times every winter. Her habits are good and regular. She sleeps well.

Her present trouble began eight weeks ago with acute sore throat and rheumatism in both arms, the right elbow being the seat of the worse pain. There was no swelling nor redness. Six weeks ago intense itching was first noticed on the back of the neck and this soon spread to other parts of the body. About a week later the first lesions of the present skin eruptions appeared. These were also noticed first on the back of the neck, then on the back of the hands and about the chin.

About the time of the appearance of the skin lesions, inco-ordinate movements were noticed. At first these movements were attributed to the itching, but soon grew so violent that she could not feed herself with the right hand.

When first seen, February 21, 1907, four weeks previous, the choreic symptoms were marked. The eruption, a guttate lesion, had appeared in other parts of the body as follows: One on the right forehead, one at the base of the nose, two or three on each eyelid, several about the mouth, many under the chin, a few on the back of the neck and scattered through the hair, one on the right nipple, one in the center of the chest, two on the back, many on the forearm, wrist and back of the hands, one in each popliteal space and a few on each leg, but none on the feet. The lesions were symmetrically placed, yet the right side had many more than the left.

The choreic movements have greatly improved under treatment, but the areas of psoriasis are increasing after a temporary improvement during the second week.

Dr. Allin said that he was impressed with the right-sidedness of the whole affair; even the pain in the right side has been much more severe.

DR. VANDERSLICE said for a first attack it has been very rapid. It is seldom one gets psoriasis during the initial stage. In this case there was practically no scaling at all and the diagnosis must be made chiefly on the location (on the knees and the extensor surfaces of the arm) and the guttate form of the eruption.

DR. H. MANNING FISH read a paper by invitation upon some of the complications of scarlet fever due to affections of the accessory sinuses of the nose. He spoke of the frequency with which a purulent coryza is mentioned in the symptomatology of scarlatina by various observers without their giving it due importance as a factor in the mortality and the severer complications of the disease. Dr. Fish believes that interference with the drainage of such coryzas may lead to absorption of the infecting organisms through the lymphatic channels, and result in lymphadenitis, purulent affections of the orbit and meninges, bronchitis, bronchopneumonia, general septicemia and death, and quoted Chaussérie Lepree to the effect that this condition renders the prognosis grave and explains certain deaths which from their rapidity can be termed unusual. Dr. Fish urged the routine examination of the accessory sinuses in scarlet fever, both ante- and postmortem, believing that systematic examination will reveal their inflammation to be a frequent cause of severe septic cases. He recommended for treatment of this condition irrigation of the nares with a fountain syringe, supplemented by swabbing and the application of astringents. Sprays and ordinary syringes should be avoided.

DR. EFFA V. DAVIS opened the discussion by asking Dr. Fish in regard to his method of irrigating the nasal passage. This had been a problem before her for many years, especially with small children, in whom the middle-ear trouble is so likely to follow the use of sufficient force to clean out the cavity.

DR. FISH confessed the difficulty of irrigating a child's nose with sprays or syringes without irritating the tissues, in addition to getting rid of the secretion. As a rule, in small children or babies he uses a very delicate probe wound with cotton.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, April 9, 1907.

DAVID S. EDSALL, M.D., PRESIDENT.

A CASE OF AMYLOID DISEASE.

DR. HOWARD CHILDS CARPENTER presented the patient.
(For a full description of this case see page 819.)

DR. C. Y. WHITE said that amyloid disease is not found as frequently at autopsy as the text-books would have us believe. Out of 68 autopsies done at the Phipps Institute, amyloid disease was found 8 times in the liver and 6 times in the spleen. Many fatty livers are called amyloid antemortem. Microscopic amyloid changes are common, but clinical amyloid disease is rare.

DR. CARPENTER said that the records of the Children's Hospital show few cases of amyloid disease during a period of fifteen years.

TINEA TONSURANS.

DR. CHARLES F. JUDSON read a brief note on the treatment of chronic cases of tinea tonsurans. Dr. Judson said that the eradication of tinea tonsurans after it has become chronic and deep-seated is not an easy matter, for after months of treatment one finds that the disease often reappears when the treatment is intermitted for a few days. The results obtained depend in great measure on the energy and perseverance of the attendant who makes the local application. Attention should also be paid to the child's general condition, and constitutional remedies administered.

In 3 or 4 obstinate cases which have resisted all treatment for three or four years, he was able to accomplish a cure by the local application of iodine petrogen, in 5 per cent. and 10 per cent. strength, massaged well into the scalp once or twice a day according to the severity of the case. This was augmented from time to time by the use of Bulkeley's depilating sticks, which consist of:—

Cera flava	3iij
Shellac	3iv
Resin	3vi
Burgundy pitch	3x
Gum damar	3iss

made into five sticks. These are heated until they become soft, and are applied successively to one patch after another until the diseased roots of hair are entirely removed. This is very painful, but is wonderfully effective. In addition to these, he used salicylic acid ointment to remove the scales. The heads were kept closely shaven.

DR. W. W. WOODWARD (by invitation) read a paper on
HEMORRHAGIC TYPHOID FEVER WITH THE REPORT OF TWO CASES
OCCURRING IN CHILDREN.

(For this paper in full see page 841.)

DR. GRIFFITH said that he had had very little personal experience with such cases in childhood, for the reason, probably, that the disease is usually mild in children. He knew of and recalled the case of a child of ten years who died from hemorrhage of the intestines. The autopsy revealed a hemorrhagic infiltration of the intestines, but very little ulceration. He had had within the year another case in which, during the course of typhoid fever, the child died of persistent epistaxis, but there were no other hemorrhagic signs.

DR. D. J. MILTON MILLER thought the condition rare in both adults and children. He had seen 2 cases. One case seen at the Children's Hospital had purpuric spots, bleeding from the lips and gums and tarry stools. This patient was put on antiscorbutic treatment and went through its course of typhoid. He thought the condition may have been typhoid fever and scurvy combined. Hemorrhages of this sort occur in other diseases, and seem to have no connection with the typhoid bacillus. He considered scurvy, purpura and the hemorrhagic diathesis closely related, and had always treated them on this principle. In several cases in adults the treatment had been effective. The condition is not as fatal as one would suppose, and the literature shows that many patients have recovered.

DR. C. Y. WHITE exhibited specimens illustrating some pathologic conditions of the brain in childhood.

DR. J. TORRANCE RUGH read a paper on

MATERNAL IMPRESSIONS WITH REPORT OF A CASE.

(For this paper in full see page 823.)

DR. GRIFFITH said that he appreciated Dr. Rugh's paper, which simply advanced the facts in the case. The question of coincidence must be considered in these cases, and the numerous instances in which there was no maternal impression must also be noted.

Implantation of the Thyroid in the Spleen for the Cure of Cretinism.—At the recent Congress of German Surgical Association, Payr communicated the results of his experiments in implanting the thyroid gland in the spleen, and also reported a case in which this operation was carried out in the human subject with success. The experiments were made upon dogs, cats, rabbits, or, in other words, animals in whom the spleen, on account of its favorable conditions with regard to its blood supply, lends itself readily to the embedding of the thyroid in the splenic parenchyma. . . . In the early experiments, Payr placed in the spleen pulp one lobe of the thyroid taken from the same animal. In the course of a few days he extirpated the remaining lobe of the thyroid. Nevertheless, there was not manifested the slightest sign of myoedema or of cachexia strumipriva, even after ten months had elapsed. But if the spleen and the enclosed part of the thyroid were removed after a short time there would be an attack of tetanus, which rapidly led to death. Basing his views upon these experiments, Payr felt justified in performing the operation upon an infant six years of age, who was an idiot. This child, for more than three years, had had the advantage of treatment with thyroid tablets. A portion of the thyroid gland was removed from the mother of the child, and was implanted in the spleen of the little patient. In both cases healing of the operative wounds occurred by immediate union. There was subsequently observed a manifest amelioration of the mental state of the child, which is still undergoing improvement.—*New York Medical Journal.*

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. LOUIS C. AGER.

DR. A. W. BINGHAM.

DR. HENRY HEIMAN.

DR. ALFRED F. HESS.

DR. J. HOWLAND.

DR. M. NICOLL, JR.

DR. G. R. PISEK.

DR. A. S. TAYLOR.

DR. S. W. THURBER.

PATHOLOGY.

Porter, William Henry: Indicanuria: Its Etiology and Practical Significance. (*Medical Record*, June 15, 1907, p. 980.)

Porter believes that at the present time there is no condition of greater importance than indican in the urine. He reviews the literature and traces the true modern conception of indicanuria. Among the chief points he would make are the following: (a) Indol has been shown to be the antecedent of the more complex body known as indican. (b) Indican has been demonstrated beyond a doubt to be the result of putrefactive fermentation. (c) Animal proteids are more likely to undergo putrefactive changes than the vegetable class. (d) Vegetable proteids are more difficult of digestion than the animal class. (e) Bacterial action was shown to be necessary by Senator for production of indican. (f) Indican is formed in the intestinal tract and numerous toxins are simultaneously produced. (g) These toxins are absorbed and produce the many symptoms. (h) Conditions favoring production of indican are dietary errors, lack of exercise, defective digestive secretions and profound disturbances of the nervous system. (i) Indican in the urine is never normal.

G. R. PISEK.

Sorel, E.: Pseudo-rheumatism in Mumps: Clinical, Bacteriological and Cytological Study. (*Annales de Médecine et Chirurgie Infantiles*, February 1, 1907, p. 73.)

The authors report briefly a case of polyarthritis in a soldier afflicted with mumps. The attack was very extensive; practically all the large joints were affected one after another, although the movability of the inflammation was not as marked as in acute rheumatism. There was a decided hydrarthrosis in one knee and some of the fluid was drawn for study. All cultures were negative. The cell elements were mainly mononuclear.

A review of the literature shows that several authors have

recognized mumps as one of the rarer causes of pseudo-rheumatism. Various degrees of inflammation may be seen, from mild joint pains to suppuration, although the process is usually mild and recovery complete. The salicylates are useless.

LOUIS C. AGER.

Rachmaninon, J. M.: Fatal Cases of Chorea. (*Archiv. für Kinderhk.*, Vol. XLV., 5 and 6 Heft, p. 378.)

The author gives the clinical history and pathological findings in 2 fatal cases of chorea occurring in girls aged twelve years and thirteen years, respectively. The symptoms are described in detail, but the autopsies in the briefest manner. No mention of the bacteriological findings is made, nor in the discussion of the bacteriology of other reported fatal cases is there any reference to the work of Poynton and Paine in England or Lewis and Longcope in this country.

J. HOWLAND.

Esser: The Etiology of Rickets. (*Münchener medizinische Woch.*, 1907, No. 17, p. 817.)

The author states a new theory as to the pathogenesis of rickets, based upon the examination of the blood. He found that the neutrophilic leukocytes of babies who were chronically overfed contained fewer nuclear fragments than is the case in infants who were properly fed. Previous examinations had shown that bottle-fed infants have a greater tendency to this blood picture than those who are breast-fed. The blood of infants afflicted with rickets likewise shows this peculiarity, and in addition gives evidence of a polynuclear leukocytosis, in severe cases reaching even 30,000 polynuclears per cmm., and a diminution of the mononuclear forms which are supposed to originate in the bone marrow. Analogy suggested that the peculiar leukocytosis was due in all instances to the same abnormal function of the marrow. This supposition was strengthened by the fact that a hypoleukocytosis has been demonstrated in cases of infantile atrophy.

Further inquiry showed that in all cases of rickets, whether bottle or breast-fed, a history of overfeeding was disclosed. Experiments upon rats showed that rickets could be produced by overfeeding, whereas the control rats of the same litter remained normal.

The author explains this leukocytosis as due to a hyperfunction-

ating bone marrow; thus the hyperemia of the marrow is to be regarded not as inflammatory, but as functional in character. The myelocytes and unripe myeloid cells found at times in the blood he ascribes to a beginning insufficiency of the marrow. The enlarged spleen he considers as a compensatory mechanism coming to the aid of the overworked bone marrow. By instituting a diet of proper quantity, he was able to overcome rickets. [This theory is difficult to reconcile with the peculiar susceptibility of Italian and negro infants to rickets.]

ALFRED F. HESS.

Menabuoni, G.: A Contribution to the Study of Mongolian Pigment Spots in European Children. (*Monats. für Kinderhk.*, January, 1907, p. 509.)

Epstein found these pigment spots in 25 out of 50,000 to 60,000 European children and considered them a sign of Mongolism. They are described as bluish spots of varying sizes, with more or less regular or scalloped outlines. They vary in number and appear mostly on the nates. In Mongolian children they may also be present on the extremities and face. They do not disappear on pressure, and are not raised above the level of the skin. Their outlines are not sharply defined. The pigment is deposited in the deepest layers of the skin. The spots disappear in later life.

The author reports the case of a seven-months-old child with congenital heart disease, whose weight was only 4.8 kg., on whose skin six such spots were present; two on the nates, one on the lower sacral region, one on the lower dorsal region, and one covering both shoulders. The author considers these spots as marks of Mongolism, since they are present in 89 per cent. of Mongolian children.

HENRY HEIMAN.

Oshima, T.: Upon the Protein Content of Infants' Stools. (*Archiv. für Kinderhk.*, Vol. XLV., 5-6 Heft, p. 405.)

In the endeavor to solve some of the much disputed questions in regard to the amount of protein in infants' stools and the origin of this, the author studied the stools of 200 infants, healthy as well as those suffering from different intestinal conditions. He admits that from this work he cannot decide whether the demonstrable protein comes from the food or not, and, if it does, in what measure, but says that it is plain that the food and the condition of the intestines have a great influence upon this protein content for the

reasons that:—Breast-fed infants showed protein only with an inflammatory intestinal condition; children who were on mixed feeding showed this with mere dyspepsia; while infants fed on cow's milk alone had protein in their stools when in a perfectly healthy condition, much more when overfed, and most of all with intestinal disease.

J. HOWLAND.

MEDICINE.

Gordon, J. F.: **A Case of Recurrent Uncontrollable Vomiting Ending in Death.** (*British Medical Journal*, October 6, 1906, p. 866.)

A little girl, about six years of age, suffered from an attack of vomiting. There was no fever and no local tenderness. Her sickness, however, continued intermittently for fifteen weeks, when she died from wasting and exhaustion. All treatment failed to have any beneficial effect. She had had a similar attack nine months before, which had quickly yielded to treatment, and in her earlier years and as a baby she had had recurrent "bilious attacks" every two or three months, which had always yielded to treatment.

The postmortem examination revealed the following conditions: The stomach was greatly dilated, extending below the umbilicus. The dilatation involved also the first, second and part of the third division of the duodenum. The cause of the dilatation was a twist which had occurred at a point in the third part of the duodenum immediately beyond where it is crossed by the mesenteric vessels. There were some old tough adhesions and the neighboring glands were enlarged. As this part of the duodenum is retroperitoneal the twist was very probably a congenital formation.

A. W. BINGHAM.

Morse, J. L.: **Diseases of the Nasopharynx in Infancy.** (*Boston Medical and Surgical Journal*, April 18, 1907, p. 489.)

The nose in the infant differs from that of the adult in being relatively long and narrow. The nasopharynx is very low. The soft palate is more horizontal; the Eustachian tubes run in a horizontal direction, and open at the level of the hard palate. The Eustachian tube at its narrowest point is wider (absolutely) than is that of the adult. The fossa of Rosenmüller is unde-

veloped, so that it is practically impossible to catheterize an infant's Eustachian tube. The external auditory canal in the infant runs downward and inward, so in making an examination of the ear with a speculum the auricle must be drawn downward and forward. The mastoid air cells are undeveloped. The retropharyngeal tissues are very vascular, and there is a chain of lymph nodes on both sides of the median line, lying between the prevertebral aponeurosis and the pharyngeal muscles.

Acute rhinitis is a serious, sometimes fatal, disease in infancy on account of its interfering with nasal respiration, nursing and sleep. It is usually accompanied by high temperature. General supportive treatment is indicated, and the local use of menthol or camphor in liquid albolene locally to the nostrils; 1 to 5,000 adrenalin is also useful. Where nasal obstruction is marked, the author found the insertion in each nostril of a small-sized catheter to be of great value.

Diphtheritic rhinitis is very common, and often unsuspected. It is nearly always a mild disease, but is the cause of severe epidemics of diphtheria in institutions. Every chronic nasal discharge should be looked upon with suspicion, especially if it is accompanied by signs of local irritation of the skin of the upper lip and about the nostrils. The discharge is usually thin, watery and acrid, rarely bloody. A membrane is almost never to be seen.

Adenoids are very commonly present in infants. They interfere with sucking, and are the most common cause of snuffles, head-colds, and irritating cough without pulmonary signs. They also produce otitis, enlargement of the cervical lymph nodes, rickets, and malnutrition. The diagnosis is best made by digital palpation.

The author has frequently seen a condition which he describes as a pharyngitis, in which there was considerable swelling and edema of the structures of the pharynx, associated with slight nasal irritation, snuffles, cough, paroxysms of dyspnea and difficulty in nursing. The local application of glycerite of tannin was found to be the best treatment.

Retropharyngeal Abscess.—This is always preceded by retropharyngeal adenitis, which gives symptoms very similar to pharyngitis. Usually the physician sees the patient after suppuration has begun. The usual symptoms are difficult deglutition, dyspnea, modification of the voice, which becomes either nasal or laryngeal, depending on whether the abscess is situated

behind the nose or just above the larynx. The neck is extended while the head is turned to one side. The abscess is situated to one side of the pharynx. This condition is often not recognized on account of its not being looked for, and is mistaken for rhinitis, pharyngitis, laryngitis, bronchitis and bronchopneumonia. Inspection is insufficient and palpation should be practiced in every case of respiratory obstruction and in respiratory diseases, where the physical signs are insufficient to account for the symptoms. Only the finger or tongue depressor should be used, as, with the use of the mouth-gag, fatal accidents have been reported. The abscess should be opened in the upright position, and the head should be tipped forward as soon as the incision has been made.

Otitis media should be looked for in every case where the diagnosis is doubtful. Usually there is restlessness, fever, and sharp cries of pain, but there may be no symptoms whatsoever; even fever may be absent. There is practically no danger of meningitis, and mastoiditis is very rare in infancy.

HENRY HEIMAN.

Rankin, Guthrie, and Mackay, Ernest C.: Achondroplasia.
(*British Medical Journal*, January 5, 1907, p. 11.)

The report of 2 cases of achondroplasia is added to the article by these authors in the *British Medical Journal* of June 30, 1906.

A. W. BINGHAM.

Finkelstein, H.: Alimentary Intoxication in Infants.
(*Jahrbuch für Kinderhk.*, January 9, 1907, p. 1.)

Under that name the author describes a symptom-complex which occurs in the course of certain diseases, especially of the alimentary canal. It is characterized by the presence of the following nine symptoms: (1) Disturbance of consciousness. (2) Change in the character of the breathing. (3) Alimentary glycosuria. (4) Fever. (5) Collapse. (6) Diarrhea. (7) Albuminuria with casts. (8) Loss of weight. (9) Leukocytosis. These symptoms are always present in cases of intoxication of the type that the author describes, but their intensity varies. The breathing is deep and rapid, there being no pause between the different phases. Glycosuria is present only when carbohydrates are included in the diet of the infant. Lactose

and galactose are present in the urine. The leukocytosis rarely exceeds 30,000.

There are several types of intoxication: the *soporose*, which is most common; the *choleroïd*, and *hydrencephaloïd*. The diagnosis is frequently made by the experienced observer by the facies and the general appearance of the infant. In the early stages there may be only somnolence; the child usually becomes quiet and reacts very slowly to external stimuli; when disturbed it quickly falls back into its former state of lethargy. It often lies with its eyelids half open and with a peculiar distant fixed gaze. The features lose their expression and the face assumes a mask-like appearance. Later catalepsy may develop, the arms and legs may assume peculiar positions. In more severe cases the patient becomes comatose, local or general convulsions occur, and sclerema may develop.

The most important diagnostic features are the character of the respiration and the alimentary glycosuria. The glycosuria appears after the ingestion of very small quantities of sugar, and is one of the first symptoms to appear. There is no relation between the gastrointestinal symptoms and the severity of the intoxication. The condition resembles most closely diabetic coma of adults. Diabetes, however, is extremely rare in infants. Moreover, it is not glucose, but lactose and galactose that are present in the urine of these cases.

Alimentary intoxication occurs most frequently in acute gastrointestinal disturbances, but it is also not rare in chronic gastrointestinal diseases, and infantile atrophy. It may also complicate any bacterial infection, such as septicemia, pneumonia, measles and scarlet fever.

The author considers the condition as a chemical reaction of the organism which occurs when a disease has reached a certain not as yet definitely defined intensity.

HENRY HEIMAN.

Finkelstein, H.: Alimentary Intoxication in Infants.
(*Jahrbuch für Kinderhk.*, March 1, 1907, p. 263.)

In his second paper, Finkelstein discusses intoxication occurring in the course of disturbances of nutrition. The author defines nutritional disturbances as those conditions in which all the phenomena can be explained exclusively by an abnormal process of nutrition.

The symptoms of intoxication are preceded by certain prodromata, such as dyspeptic stools, loss of weight, and slight irregularities of temperature. The duration of the prodromal stage (the stadium dyspepticum) is variable. The slightest increase in the amount of food during this stage is often sufficient to bring about intoxication. Finkelstein has succeeded in practically exterminating this complication in his institution in Berlin by cutting down the diet of the infants during the stadium dyspepticum. The effect of diet is even more marked during the active existence of intoxication, a slight increase often producing a decided change for the worse. If food is withheld and only water, salt solution, or unsweetened tea is given, the temperature drops rapidly, and convalescence sets in. Food must be added slowly and in very small quantities at a time, or a relapse is sure to occur.

Finkelstein has found that the different elements of milk differ in their ability to produce intoxication in susceptible infants. Sugar and fat are the food elements which are most concerned in the production of intoxication, sugar being the more active of the two. Strange to say, casein and albumin have no such influence. Finkelstein found that a solution of casein is no more harmful than is water or salt solution.

Nature of the Poisons.—The author gives several reasons why they should not be considered bacterial in origin. The reaction and odor of the stools vary, and there is no definite intestinal bacterial flora in these cases.

Alimentary intoxication is a symptom-complex resulting from the presence in the body of certain intermediary products of metabolism.

We are not justified in assuming without further chemical investigation that those substances which when added to the diet produce intoxication, such as fat and sugar, are the immediate antecedents of the poisons. In fact, nothing is known as to the chemical nature of these poisons.

As a result of his careful studies the author draws the following conclusions:—

- (1) The intoxication is alimentary in nature.
- (2) It appears when certain elements of food are given in larger quantities than can be used up by the organism.
- (3) Fat and sugar are the most important of these, while albumin is incapable of producing the condition. The influence of the salts is as yet doubtful.

(4) Nothing definite is known about the chemical nature of the poisons.

(5) The basis of the disease is an insufficiency of nutrition, while the intoxication is only a transitory condition, betraying the presence of the disease.

HENRY HEIMAN.

Gabritschewsky, G.: The Relation of Streptococcus Erythema to Scarlet Fever. (*Berlin. klin. Woch.*, May 6, 1907, p. 556.)

Besnier, in his monograph on the pathogenesis of erythemas, distinguishes three forms: (1) Scarlatiniform, (2) scarlatinoid and (3) scarlatinous. Under scarlatiniform he describes those erythemas which are not specific in character and not contagious. This group includes the toxicoderms, which are due to various drugs such as quinin, mercury, antipyrin, belladonna, etc. They may be accompanied by fever and some desquamation, but the throat always remains unaffected. Under the second group, Besnier describes those erythemas which are infectious but not contagious. They are usually complications of other infectious diseases, as septicopyemia, and are often accompanied by affection of the mucous membranes of the throat, respiratory and digestive tracts. Desquamation usually occurs early. Some authors, as Baginsky, consider scarlet fever as due to an infection with streptococci, while others attribute its complications only to that organism.

In a series of injections with the author's streptococcus vaccine by various observers in Russia, an erythema resembling closely that of scarlet was observed in a variable proportion of the cases. This "vaccination-scarlet" differed from the ordinary scarlet by the following characteristics: (1) The rise of temperature, exanthema, angina and vomiting appeared soon after the injection, and the disease reached its acme at the end of the first two days. (2) The universal erythema was fainter, and the desquamation, if present at all, was furfuraceous rather than lamellar. (3) The kidneys were rarely affected. (4) The angina was less marked and membrane-formation was rarely present. (5) The temperature rarely rose above 39° C. (6) Absence of epidemics preceding or following the occurrence of the disease.

As a result of these series of injections, the author comes to

the following conclusions: (1) The streptococcus can produce erythemas resembling those occurring in scarlet fever. (2) Vaccines prepared from streptococci which are present in the throat of scarlet fever patients likewise produce similar erythemas. (3) The punctiform erythemas of scarlet fever, scarlatinoid, and those produced by streptococcus vaccines are identical in nature. (4) These facts favor the assumption that the streptococcus is the specific agent of scarlet fever, and (5) furnish the scientific basis for the use of Moser's serum and the author's streptococcus vaccine.

HENRY HEIMAN.

SURGERY.

Yates, H. W., and Davis, J. E.: Congenital Umbilical Hernia; with Report of Three Cases Operated. (*American Medicine*, January, 1907, p. 20.)

This deformity is said to be exceedingly rare—1 case in about 5,000 births. It is apt to be associated with other deformities. Its development and pathology are reviewed by the authors. The prognosis is bad—without operation about 40 per cent., with operation, less than 25 per cent.

Various operations have been recommended, the choice depending upon the nature of the hernia.

Three cases are reported in this paper. All were operated upon; one survived, two died.

In the *Philadelphia Medical Journal* for February 23, 1901, 90 cases were tabulated. The authors here tabulate 15 more and give a number of other references to the subject.

LOUIS C. AGER.

Rotch, T. M., and Murphy, T. F.: Gastroenteric Obstruction in Early Infancy. (*Boston Medical and Surgical Journal*, May 9, p. 589.)

The symptoms of obstruction in infancy are due to four morbid conditions: cardiac, or pyloric, stenosis, intussusception, volvulus and appendicitis. The symptom of vomiting by itself is of no diagnostic importance, as it occurs in many conditions and diseases of infancy, and is most frequent in gastrointestinal indigestion. The type of vomiting in obstruction most closely resembles

that of cyclic vomiting, but in the latter affection it is accompanied by nausea. In its being expulsive in character, it simulates the type of vomiting occurring in meningitis.

Pyloric Stenosis.—It is important to differentiate this abnormality from pyloric spasm. When the symptoms are due to spasm, a dietetic cause can usually be found, and the condition is amenable to treatment. The symptoms of pyloric stenosis do not usually appear before the third week. The chief symptom is expulsive vomiting. Visible peristalsis and palpable tumor are not always present. Dilatation of the stomach can often be demonstrated, but a fullness in the epigastrium after ingestion of food is of greater diagnostic importance. The fecal matter is small in amount and resembles meconium, being dark and pasty. There is usually considerable loss of weight. Bile is rarely present in the vomitus. In establishing the diagnosis, it is of first importance to exclude gastrointestinal disturbances by withholding food for a time, when vomiting will cease. If the infant is only three to four weeks old we can eliminate appendicitis, peritonitis and intussusception, as these affections are very rare at this age. Malformation and stenosis of the intestines are also rare, and so we conclude that the existence of pyloric stenosis is the most likely, especially if bile is not present in the vomitus.

If called to a case of persistent vomiting, we should wash out the stomach and give it rest, when vomiting will probably cease. If after twenty-four hours good breast milk, or properly modified cow's milk, is again vomited in a projectile manner, we have reason to suspect that an obstruction is present. If whey is also vomited we should diagnose obstruction, functional or organic. We now give alkalis and strongly alkalized milk; if no improvement follows and the infant steadily loses in weight ($\frac{1}{2}$ pound a day), operation should not be delayed. After the operation, feeding by mouth should not be begun for at least twenty-four hours. Too much food should not be given for some time after the operation, to allow the dilated stomach to assume its normal size.

Volvulus.—In infants the mesentery is long and attached in the median line, thus favoring the production of volvulus. The symptoms vary somewhat with the seat of obstruction. If it is high, vomiting occurs early, and bile and fecal matter soon appear in the vomitus. In volvulus of the sigmoid flexure blood

may be present in the stool. The symptoms are more likely to be intermittent in this than in other forms of intestinal obstruction.

The diagnosis of the exact condition can rarely be made, except that intermittency of symptoms points to the existence of a volvulus. If vomiting persists after gastric lavage, an exploratory laparotomy is indicated.

HENRY HEIMAN.

Cannaday, John Egerton: Strangulated Hernia in Infants with Report of a Case. (*International Journal of Surgery*, April, 1907, p. 101.)

Strangulated hernia is very rare in infants, occurring in less than $\frac{1}{2}$ per cent. of cases of hernia. There are three symptom groups: strangulation shock—nausea, vomiting, thready pulse, pallor, cold perspiration; intestinal obstruction—distention, fecal vomiting; sepsis—general, and with local symptoms of peritonitis. The hernia is irreducible and is often sensitive to touch. Often the symptoms are atypical and very slight. Prognosis is always bad without intervention.

Early in mild cases taxis may be resorted to, but often wastes valuable time, causes reduction *en bloc*, or damages an already injured intestine. In operative interference the gut may have to be resected and suture of intestine or formation of an artificial anus resorted to. The cord should not be transplanted in these cases. Case of three-months' child is cited.

A. S. TAYLOR.

Sprague, Frank B.: Observations in 1,000 Adenoid Operations. (*Annals of Otology, Rhinology and Laryngology*, March, 1907, p. 180.)

The author's cases are about equally divided between male and female. The largest number at any one age was 64 operations at the eighth year. About 90 per cent. had enlarged tonsils also. He believes that 50 per cent. of all inflammations of the tympanum are due to adenoids and that hypertrophied tonsils are always an indication of adenoids. Ether for anesthesia and the forceps as the instrument are preferred; going to show that different operators get their best results with the means they are most used to, especially with regard to the different forms of instruments.

S. W. THURBER.

Campbell, Robert: Acid Intoxication Following General Anesthesia. (*Medical Press and Circular*, February 20, 1907, p. 198.)

To the rapidly increasing number of fatal cases reported as due to general anesthetics, especially chloroform, and developing sometimes after their use, the author adds 3 personal ones. These all followed the use of chloroform and were in children aged four years, five years and six years. Postmortem examinations were obtained in all cases and an extensive fatty degeneration of the liver found in each one. The symptomatology of the condition is briefly discussed.

J. HOWLAND.

HYGIENE AND THERAPEUTICS.

Denny, Dr. F. P.: Value of Small Quantities of Human Milk in the Treatment of Infantile Atrophy and the Infections of Infants. (*The Journal of the American Medical Association*, December, 1906, p. 1,904.)

The author makes a strong plea for the use of at least small amounts of breast milk where artificial feeding is necessary, especially in cases of infantile atrophy. Dr. Denny has had good results in a number of cases which he reports.

Through Moro's investigations, he shows that the bactericidal power of infant's blood at birth corresponds very closely with the placental blood. Following the breast feeding there is an increase, so that it is considerably greater than that of the mother's blood, while on the artificial diet there is a rapid falling off.

SUMMARY.

(1) The chief causes of failure of an exclusive artificial diet are: (a) disturbances of assimilation, of which infantile atrophy is an extreme type; (b) a diminished resistance to bacterial infections.

(2) The benefits of human milk in these conditions probably depend on the action of ferments, and it is therefore rational to expect to get results from the use of small amounts of human milk.

(3) Good results are obtained by the addition to the infant's diet of 2 to 5 ounces of human milk a day.

(4) Discretion must be exercised in giving breast milk in the early stages of a gastrointestinal infection.

(5) It is poor practice and unjustifiable to have a wet nurse abandon her own child in order to nurse a sick baby.

(6) Much can be done with breast milk obtained from poor mothers, women living at home, who come to the hospital or house a few times a day. The amounts obtained at each nursing should be determined by the nurse's compensation and made proportional to the quantity furnished.

(7) It is unjustifiable to keep babies in hospitals or institutions unless a sufficient amount of breast milk is added to their diet to render them resistant to hospital infections.

G. R. PISEK.

Fürst, L.: Concentrated Foods. (*Centralbl. für Kinderhk.*, March 1, 1907, p 77.)

Pure, dry crystalline malt (malto-crystal) introduced by Brunnengraber of Rostock is a form of highly concentrated food which has been found very useful in conditions of malnutrition and the like in infants and children as well as adults. It is easily digested, soluble, and very nutritious, retarding intestinal decomposition.

In calories a teaspoonful is equal to one egg (60 calories). The patients take it readily and it may be continued for a long time without becoming distasteful. It may be given in several media—wine, soup, milk and broths.

A marked increase in body weight and improvement in general condition have followed its administration in a number of different conditions cited by the writer. In chlorosis some form of iron should be added. The dose for adults is three to four tablespoons a day, and for children the same number of dessert or teaspoons according to age.

M. NICOLL, JR.

Ker, Claude B., and Croom, David H.: The Therapeutic Value of Formic Acid in the Treatment of Diphtheria. (*Edinburgh Medical Journal*, June, 1907, p. 487.)

In the early months of 1906 Croom treated 100 cases of diphtheria with formic acid. As the results, published in October, 1906, were considered somewhat encouraging, the authors continued the treatment throughout the year. In all, 412 patients received the medication. The death rate was slightly reduced and the effect on the pulse and general condition of the patients was

said to be beneficial, but it was the decrease in the amount of paralysis which was most striking. In 1902 and 1903 the percentage of cases developing paralysis was 17, in 1904 slightly over 12, in 1905, 9.09, while in 1906 it fell to only 2.9. No explanation for this is attempted.

The diuretic effect of the drug is stated to have been disappointing. The method of administration was in a 25 per cent. solution of which 5 to 20 minims were given in water every four hours. No tendency to nausea or vomiting was noticed. The authors purpose to continue their investigation, using only alternate patients for the treatment and the others for controls. Diphtheria antitoxin is given to all patients, the formic acid treatment being merely supplementary.

J. HOWLAND.

Clarke, C. K.: The Detection of Mental Defects in School Children. (*The Canadian Journal of Medicine and Surgery*, June, 1907, p. 343.)

Clarke points out that 15 per cent. of the chronic insane in Ontario are cases of dementia precox. The first evidences of the coming mental breakdown were seen during the school days of these children, and hence the importance of the subject.

The writer supposes that eventually teachers will co-operate with physicians who are familiar with mental diseases in all of its stages, and the proper course will be mapped out for the individual who is not equal to the strain of public school work.

G. R. PISEK.

Punton, John: Nervous Disorders of Children: Their Relation to School Life and Work. (*American Medicine*, February, 1907, p. 79.)

As the organic nervous diseases usually prevent school attendance, it is the so-called function diseases that are met in the class-room—headache, neuralgia, chorea, hysteria, epilepsy, nervous prostration, feeble-mindedness, dementia. To appreciate the danger of bringing on these conditions it is necessary to bear in mind some of the facts in regard to the development of the nervous system. For instance, the brain at the age of eight has attained 90 per cent. of its adult weight, yet it does not develop its full activity till many years later. Moreover, the highest faculty of the brain cell, which is inhibition, that is, self-restraint, is the

last to develop; and any undue strain during its development is a serious menace.

The preservation of health depends almost entirely upon the influence of the nervous system on the bodily organs. As the inhibitory power is not well developed in the child, there is a strong tendency to excessive motor activity, and in case of overstrain there naturally result the various convulsive diseases. The writer discusses at some length the subject of heredity and he is evidently a firm believer in the theory of the transmission of acquired characteristics.

L. C. AGER.

Thompson, H. P.: The Prophylaxis of Scarletinal Nephritis: Observations on 300 Cases of *Scarlatina* Treated with Urotropin, Hexamethylenetetramin and Metramin. (*Edinburgh Medical Journal*, February, 1907, p. 103.)

The three drugs, hexamethylenetetramin, urotropin and metramin, were given to scarlet fever patients as soon as brought to the hospital and continued for twenty-eight days. The object was to test their effect on the prevention of nephritis. Hexamethylenetetramin was given to 137 patients, and, of these, 15 developed nephritis (10.9 per cent.). Of the controls, 66 in number, 6 developed nephritis (9.09 per cent.). Metramin was given to 26 patients, of whom 3 developed nephritis (11.5 per cent.). Of 90 controls, 8 developed nephritis (8.8 per cent.). Urotropin was given to 47 patients and none developed nephritis. For these urotropin patients there were no controls.

The results were encouraging, and the author advises the use of urotropin in all cases of scarlatina, 5 grains three times a day for children under twelve years and $7\frac{1}{2}$ grains three times a day for those over twelve years of age.

[It is hard to see how urotropin should differ so markedly in its effect from the other drugs employed, as it is itself hexamethylenetetramin, and is only made in a different way by Nicolaier's process. Metramin is a proprietary drug made in a similar manner, but recrystallized once oftener than hexamethylenetetramin.

Compare with Thompson's results those of Preisich (*Die Therap. der Gegen.*, 1905, p. 211), who treated 600 cases of scarlet fever with urotropin and had also 600 controls. Nephritis supervened in 55 (9.16 per cent.) of the urotropin cases and in 82 (13.66 per cent.) of the controls.]

J. HOWLAND.

ARCHIVES OF PEDIATRICS.

VOL. XXIV.]

DECEMBER, 1907.

[No. 12.]

Original Communications.

ON THE BACTERIOLOGY OF MENINGITIS.*

BY FRANK SPOONER CHURCHILL, M.D.,

Assistant Professor of Pediatrics, Rush Medical College (in affiliation with the University of Chicago).

It is customary to divide cases of meningitis into the tuberculous and the nontuberculous and to group the latter into the epidemic cerebrospinal due to the diplococcus of Weichselbaum, or meningococcus, and acute simple due to a great variety of organisms. Personal experience with a limited number of cases emphasized anew the varied etiology of the disease and the present study was undertaken to see to what extent this variety prevails, how the organism gains access to the system, what, if any, difference there is between the different types, and what the prognosis is in the various forms. Nontuberculous cases only have been reviewed. I have included in my own series, however, 3 cases of the tuberculous variety which seem to be of special interest; 2 of mixed infection, 1 showing tubercle bacilli in the spinal fluid and proved at autopsy to be primary in its nature. I am indebted to Dr. H. W. Cheney for the last case, which he has reported in full in *Pediatrics*, October, 1905.

Details of my own cases are given in the table, a glance at which shows what a varied and complex bacteriology inflammation of the meninges may have. We find the following:—

12 cases of meningococcus in pure culture.

1 case of the pneumococcus and the colon bacillus at autopsy.

1 case of the pneumococcus in the spinal fluid and tuberculous meningitis at autopsy.

1 case of primary tuberculous meningitis with tubercle bacilli in the spinal fluid.

1 case of a possible Klebs-Löffler bacillus in a tuberculous meningitis.

1 case of syphilitic meningitis.

4 cases of undetermined cocci.

5 cases with no organisms at all in the spinal fluid.

*Read before the Nineteenth Annual Meeting of the American Pediatric Society, Washington, May 8, 1907.

BACTERIOLOGY OF MENINGITIS.

Casc.	Age.	Sex.	Antemortem.	Postmortem.	Remarks.
I.	13 yrs.	M.	Sp. Fl.: Turbid; smear and culture showed diplococci destained by Gram. (5th day.)		Sc. Fever 3 weeks before; pneumonia (double) for 3 days; recovery; 29 days' duration.
II.	3 yrs.	M.	Sp. Fl., 21st day: Clear; few lymphocytes; culture contaminated. 23d day: Slightly turbid; no growth. Profuse nasal discharge showed diplococci, staphylococci and short bacillus.		Death at 4 weeks; probably tuberculous from character of Sp. Fl., but not proven.
III.	6 mos.	F.	Sp. Fl., 10 days: Clear; many polymorphonuclears; meningococcus in smear and culture. 21 days: Same, plus staph. albus.	Purulent meningitis; meningococcus in exudate; cultures from pericardial fluid, heart blood and mesenteric lymph glands, negative.	Death, 1 month from onset.
IV.	5 yrs.	M.	Sp. Fl., 4 weeks: Clear; culture negative. 5½ weeks: Turbid; lymphocytes; cocci, not in pairs. 9 weeks: Cocci, not in pairs; lymphocytes.		Double optic atrophy; recovery, 6 months.
V.	21 mos.	M.	Sp. Fl., 4 weeks: Clear; many lymphocytes; culture: large diplococci retaining Gram, extracellular. 9 weeks: Same, plus staphylococci. 10 weeks: Clear; culture negative; no polymorph. cells in any specimen.		Recovery after 3½ months. Double optic neuritis; recovery.
VI.	5 mos.	M.	Sp. Fl.: Clear at first, cloudy later; many lymphocytes; no organisms.		Death, 15 days from onset.
VII.	3½ yrs.	M.	Sp. Fl., 3 weeks: Clear; few lymphocytes; very few polymorph; no organisms in smear or culture. 3½ weeks: Tubercle bacilli in fluid; several punctures, all clear, all with lymphocytes.	Primary tuberculous meningitis; no tuberculosis elsewhere. (Autopsy by Dr. H. G. Wells.)	Death, about 5 weeks from onset.
VIII.	10 yrs.	M.	Appendix: Pneumococcus; no colon b.	Brain: pneumococ., colon b; cord: pneumococ.; gall bladder: pneumococ., colon b; kidney: colon b; cerebral meningitis, pneumonia.	Started with appendicitis; operation 8th day; meningeal symptoms, 9th day; death, 10th day.
IX.	8 yrs.	F.	Sp. Fl., 2 months: Clear. 3 months: Slightly turbid; few small mononuclears; smear and culture: pneumococci; inoculations negative.	Solitary tubercles in cerebellum; miliary tuberculosis of meninges, pleurae, lungs, spleen, liver, etc.	Death at about 3 months.
X.	3 yrs.	M.	5th day: Cultures from eye discharge and from nose showed meningococcus; cultures from ear (discharging) showed streptococci and staphylococci only; cultures from blood, negative. 6th day: Sp. Fl. turbid; cultures showed meningococcus; throat cultures showed streptococci and diplococci.		Discharged improved 1 month after onset; died day after leaving hospital.
XI.	2½ yrs.	F.	Sp. Fl., 9th day: Turbid; smears and culture showed meningococcus 6th week: Less turbid; smears: polymorphonuclears; no organisms.		Left hospital 2 months after onset. "unimproved."
XII.	15 mos.	F.	Sp. Fl., 8th day: Bloody; smears: red corp., few lymphocytes; cultures: diplococci. 11th day: Clear.		Death, 15 days after onset.
XIII.	9 yrs.	M.	Sp. Fl., 6th day: Slightly turbid; cultures negative; 2 later punctures both failed to get any fluid; cultures from needle were negative.		Death, 22 days after onset.
XIV.	8 yrs.	M.	Sp. Fl.: Clear; smears and cultures negative.		Serous meningitis of 2 years' duration; in hospital about 1 month; discharged, unimproved.

BACTERIOLOGY OF MENINGITIS—*Continued.*

Case.	Age.	Sex.	Antemortem.	Postmortem.	Remarks.
XV.	10 yrs.	M.	Sp. Fl.: Turbid; polymorph.; meningococci, intra- and extra-cellular; 2d and 3d specimens, same; smears from throat: pneumococci; blood cultures: meningococci; smears and cultures from nose showed Gram negative diplococci, probably meningococci.		Serum of this patient agglutinated homologous meningococcus strongly at 1:20, slightly at 1:50; was negative at 1:100 after 12 hours, with normal serum agglutination negative at 1:10; blood and serum of patient bactericidal for meningococci; death, 11 days after onset.
XVI.	6 mos.	M.	Sp. Fl., 3d day: Turbid; diplococci. 8th day: Less turbid; diplococci.		Meningeal symptoms followed immediately after burn of face; recovery.
XVII.	4½ mos.	M.	Sp. Fl., 10th day: Slightly turbid; cultures after 24 hours showed no growth; after 48 hours showed organism resembling morphologically and culturally Klebs-Loeffler b. Sp. Fl., 13th day: Slightly turbid; same organism.	General military tuberculosis; meninges (base and cortex), lungs, liver, spleen and intestines.	Death, 14 days after onset of acute symptoms.
XVIII.	6 yrs.	F.	Sp. Fl., 11 days: Clear; no cellular elements; cultures: no growth.		Congenital syphilis in self and sister, in hospital same time; recovery from meningeal symptoms complete, 7 weeks from onset.
XIX.	4 yrs.	F.	Cultures from throat and from nose showed the meningococcus 4th day. Sp. Fl., 4th day: Many polymorph.; meningococci.		Death on 7th day.
XX.	15 mos.	M.	Sp. Fl.: Cloudy, slight pressure (5th week). Smears: Many leukocytes; polymorph., mononuclears and disintegrating cells in about equal proportions; numerous Gram neg. diplococci. Cultures: Pure culture of Gram neg. diplococci intracellular, growing on blood serum-agar only. Sp. Fl., 8 days later: Clear; negative in smears and cultures; cultures from nose negative (6th week).		General condition somewhat better.
XXI.	8 yrs.	M.	3d day: Sp. Fl. purulent; many polymorph. cells; many meningococci. 19th day: Sp. Fl. clear; meningococci in smears and cultures. 29th day: Abscess on left buttock; staphylococcus only.		Died after 2½ months.
XXII.	3 yrs.	M.	5th day: Sp. Fl.: Meningococci.		Died.
XXIII.	5½ yrs.	M.	7th day: Lumbar puncture unsuccessful. 9th day: Cultures from nose, herpetic vesicles and blood all neg. 15th day: Culture from purulent discharge from eye showed unclassified Gram neg.; diplococcus. 22d day: Sp. Fl. turbid; meningocci.		Died, 51st day.
XXIV.	2½ yrs.	M.	4th day: Sp. Fl. turbid; meningococci.		Recovery.
XXV.	9 yrs.	M.	5th day: Lumbar puncture; no fluid. 10th day: Cultures from nose and throat and blood all showed meningococci. 20th day: Sp. Fl. turbid; many polymorph. cells, some containing meningococci.		Recovery.
XXVI.	3 yrs.	F.	3d day: Sp. Fl. purulent; many polymorph cells; meningococci.		Death on 4th day.

All were undoubted cases of meningitis. The only one not proved to be such either by lumbar puncture or autopsy is Case XVIII., and in that one the symptoms were so well defined that there could be no question of the presence of an actual meningitis and of its syphilitic nature. She was a six-year-old girl, colored, who had always been "sickly." Two days before admission to the hospital she complained of headache and later in the day suddenly became unconscious. She was admitted in that condition. Physical examination showed a poorly-nourished child with many syphilitic lesions and old scars on various parts of the body and a large ulcer on the left ankle. The head was retracted, Kernig's sign was present, pulse weak and irregular. She could be roused, but immediately lapsed back into semiconsciousness. The pupils were normal and never showed any abnormality throughout the illness.

She remained in this condition for about ten days and then began slowly to improve and was discharged well seven weeks from date of onset. She ran a low temperature, the highest record being 101.4° , never had a convulsion, at times only slight rigidity. Both the pulse and respiration were at times irregular. She had a leukocyte count of 28,400 on the eighth day of illness. A four-year-old sister occupied the bed next to the patient and also had marked lesions of syphilis (congenital), but no signs of meningeal irritation. Both children recovered under antisyphilitic treatment.

The character of the spinal fluid was interesting and apparently unusual in its freedom from cellular elements, most cases of congenital syphilis showing in the fluid a marked excess of lymphocytes (Tobler). The absence of organisms is in accordance with most observations on these cases. Similar fluids have been recorded in cases of supposed tuberculous meningitis "cured" and it is not at all improbable that some of these were in reality cases of syphilitic meningitis.

The proportion of recoveries, 9 of the 23 nontuberculous cases, or 40 per cent., is about the general average. Of these, 4 were of the meningococcic type, 3 of undetermined cocci, 1 with no organisms and the syphilitic case. One of the meningococcic cases and one of those with no organisms, however, left the hospital with severe after-effects—deafness, blindness, etc.

The following cases are of especial interest: Case I., show-

ing the development of a pure meningococcic meningitis during the course of a lobar pneumonia with ultimate recovery from both conditions; Case VIII., a pneumococcic appendicitis and secondary involvement of the meninges by the pneumococcus and colon bacillus; Case IX., with pneumococci in the spinal fluid and tuberculous meningitis at autopsy.

No conclusions can be drawn from so small a number of cases. They merely show what *may* happen. They emphasize the fact that the meninges, like other tissues of the body, may be attacked by a great variety of organisms. How numerous these organisms are, and how frequently they attack the meninges, can be determined only by study of large numbers of cases. Such studies have been made in the epidemics which have occurred during the last five or six years. The results of these studies I have collected and now present as follows:—

The total number of cases collected is 1,800, of which 1,423, or about 80 per cent., were due to the meningococcus; 178, or 10 per cent., to the pneumococcus, and the remainder, 179, to various organisms:—streptococcus, staphylococcus, pyocyaneus, colon b., typhoid b., proteus vulgaris, b. lactis aerogenes, gonococcus, b. anthrax, b. influenza, etc. No case has been included which did not show either a positive spinal fluid or proof of meningitis at autopsy. The discussion of these organisms will be taken up separately.

The Meningococcus.—This diplococcus was first discovered and isolated by Weichselbaum in 1887. A few years later Heubner and Jager classified what they considered different types of the organism, but critical analysis of their work showed that they were not dealing in all their cases with the meningococcus, and it is now generally conceded that we have to do with only one type of the organism. It presents certain morphological and cultural peculiarities; it is gonococcus-like in form, dividing in the same way, is always Gram-negative, is often intracellular and has many degenerate forms. It grows luxuriantly on agar plates and only at fairly high temperatures, 25° to 42°, with a maximum growth at 36°C. For blood cultures it grows on a mixture of ascitic fluid, one part, and plain bouillon, two parts. The best fluid seems to be a chest fluid rich in albumin. It is nonresistant and sensitive to cold. It is liable to confusion with only one other organism—the micrococcus catarrhalis. It can be differentiated from the latter only by cultures, not by smears alone.

The great preponderance of cases of meningitis due to the meningococcus is well known, and the chief interest in them from the bacteriological point of view centers in the port of entry of the organism into the system and in its distribution in the body. The more carefully cases are studied the more evident it becomes that it is very widespread in its distribution. It has been studied antemortem and postmortem. Antemortem, it has been found most frequently, of course, in the spinal fluid, 80 per cent. of undoubted cases of meningitis showing the organism in this fluid. This figure would undoubtedly be higher with repeated examinations, as the character of the fluid is known to change from time to time and several examinations are necessary, in some cases, before we get positive results. Besides its presence in the spinal canal the meningococcus has been found in the nose, throat, conjunctivæ, tonsils, joints, blood and herpetic vesicles. Postmortem, it has been found in the cerebral and spinal meninges, peri- and endocardium, lungs, liver and spleen. It is apparently nearly as ubiquitous as the pneumococcus and colon bacillus.

I have but few investigations to report in my own series. The results of lumbar puncture are given in the table. The meningococcus was also found in the nose or throat in 4 of the 6 cases tested; in 1 of the negative cases the examination was not made until the sixth week of illness. It was found once in the conjunctivæ, and in the blood in 2 of the 4 cases tested.

Recent literature, however, contains many observations on the distribution of the meningococcus, special attention being paid to its presence in the nose and throat, both in the healthy and in the sick. Two points are discussed: the frequency of the germ in these localities; and secondly, its origin in these parts, whether primary or secondary.

Frequency.—The reports are somewhat conflicting. Numerous cases are reported where the meningococcus is said to have been found, but doubt is expressed by some observers, notably Flexner, Goodwin and von Sholly, as to the identity of the diplococcus detected. The criticism is made that in many cases the organism reported is not the meningococcus, or, at least, that it is not proved beyond a doubt to be such, but that it may be some other organism closely allied to the meningococcus, *e.g.*, the micrococcus catarrhalis. The latter is often found in the respiratory passages when inflamed, and especially in children; it, fur-

thermore, closely resembles the meningococcus in many respects, and the one might be mistaken for the other by the inexperienced or on careless and insufficient examination. While there can be no doubt that some of the earlier reports on this subject were erroneous and cases of micrococcus catarrhalis were reported as cases of meningococcus, more recent and more thorough investigations by reliable observers tend to show that the meningococcus is found in the posterior nares and pharynx in a considerable number of patients ill with meningitis of this type. There are certain differences between the two organisms which enable the expert to distinguish between them; these differences are cultural and agglutinative, and in collecting the data on this point I have accepted only reports so studied. Thus I have collected 772 cases, in which 185, or 25 per cent., gave positive results. Individual workers, however, report higher figures than this, the discrepancy depending apparently upon the time of examination, whether early or late in the disease, care in technique, method of cultivation, etc. Thus Bolduan and Goodwin, examining 22 cases of meningococcus meningitis, during the first week found the organism in the nose in 50 per cent. of the cases. Elser found it in 6 of 21 cases at the same period of the disease. Von Lingelsheim's series is the largest one on record; he made 1,500 examinations on 1,200 people, 635 of whom were ill with meningococcus meningitis. He obtained only 146 positive results in these 635 patients. His studies were made on cases in and around the town of Methuen in the winter season and the patients were scattered over a considerable extent of territory; hence the inoculations of media were made, in many cases, long after the swab was applied to the patient's throat, in some instances twenty-four hours after. Furthermore, von Lingelsheim noticed in his own cases that he got positive results more frequently when he passed the swab far back into the nose. He attributes his low *general* average to these conditions: the cold weather, the distance from his laboratory, the carelessness or inexperience of the attending physicians. His reasoning seems justified, for of 68 patients examined with attention to all these details he got positive results in all—a most significant report.

Elser had a similar experience with the cases far from his laboratory, also in cold weather.

The investigations as to the presence of the meningococcus in

the nose and throat of healthy persons are equally interesting, and in some respects of more practical importance. This aspect of the question has been studied by the authors already quoted and also by Ostermann, Schiff, Kiefer, Lord, Albrecht and Ghon, Weichselbaum and others. Their observations have been made on healthy people living in close contact with cases of meningitis and on people not so living. They never found the organism in the nose or throat of the latter group. They have found it repeatedly in the former. Von Lingelsheim found it in 26 of 289 people examined; 56 school children gave positive results in 4. Goodwin and von Sholly, examining 50 people, found it in 10 per cent. Ghon found it in 15 healthy people in the Trifail epidemic. Kiefer working with the meningococcus had an interesting experience. He was seized with a coryza and found the meningococcus in his own nasal secretion. Maragliano made rabbits inhale virulent cultures of the meningococcus and produced in them meningococcic meningitis.

The practical importance of this discovery is obvious. It helps explain the mysterious way in which epidemics in the past have been spread. A striking instance of this is the recent epidemic among the miners in Silesia studied by Ostermann. Measures to check the epidemic failed entirely. Flügge attributes this failure to the presence of the meningococcus in the nose and throat of healthy people living in close contact with patients and the mingling of these people with the community at large.

The evidence, then, as to the presence of the meningococcus in the nose and throat, both of the sick and of the healthy living intimately with the sick, seems to justify the conclusion that the meningococcus is present in a considerable number of the sick and in a smaller number of other members of the family of the sick. The obvious lesson is that both the patient and his family should be isolated.

Origin.—How does the meningococcus get into the posterior nasal space? Does it come from without inward or from the cranial cavity outward? Flexner, in some most interesting work on experimental meningitis, discusses this point. He produced in monkeys meningococcic meningitis by injections of meningococci into the spinal canal, studied the cases clinically and postmortem. He traced the inflammatory process from the brain outward into the nasal mucosa, as shown by the course of the

leukocytes. He found the mucosa invariably inflamed, obtained from it in smears diplococci presenting the morphology, staining properties and degeneration of the meningococcus found in the brain and spinal cord, but did not succeed in cultivating the meningococcus. Thus final proof was lacking. In view of these results, showing the outward progress of the inflammatory process, Flexner urges that attention be given to this possibility, *i.e.*, that the nasal condition is secondary and not primary.

Flexner's work, however, was done on monkeys, and he admits himself that the conditions in the nasal passages of these animals are less favorable for the growth of meningococcus than are the conditions in the same parts in man. Autopsies on man seem to point in the other direction. Westenhoeffer, from 29 autopsies, 22 of them on children, performed under the supervision of the German Government, concludes that the infection started in the pharyngeal tonsil and entered the cranial cavity through the sphenoid bone, affecting first the pituitary body. He thus regards it as an inhalation disease, conveyed to the brain by the lymphatics. He found in all the so-called "status lymphaticus."

The investigations during life, showing the presence of the meningococcus in the healthy, and in the sick more frequently in the early days of the disease than later, tend to uphold Westenhoeffer's view. Were the process primary in the cranial cavity we should expect to find the organism in the nose more frequently late in the disease, whereas it is quite the reverse. Again, there are on record cases where the meningococcus has been recovered from the blood and joints before the onset of meningeal symptoms and before the detection of the diplococcus in the spinal fluid, tending to show that its primary seat was not in the meninges.

On the whole, the evidence as to the primary seat of the meningococcus in cases of meningitis of this type points strongly to the tonsils and posterior nares as this primary seat. When we consider how frequently other microorganisms enter the system via this route, especially when the tonsils are diseased, it is perfectly natural to suppose that the same ground is a congenial soil for the lodgment and growth of the meningococcus. It is an additional reason, were any needed, for care and attention to this part of the child's anatomy.

Eyes.—The meningococcus has been found in the inflamed

conjunctivæ in cases of meningitis by Robinson and others, though less frequently than in the nose and throat.

Blood.—The organism is apparently not a frequent invader of the blood, 18 out of 62 recorded cases (30 per cent.) showing its presence here. Recent studies, however, make us believe that as bacteriological methods of research improve, it will be found more frequently than heretofore. Councilman, Mallory and Wright, for instance, did not isolate the organism from the blood in a single one of their 111 cases in 1898. Yet Elser, in 1905, found it in 10 of 41 cases (25 per cent.), and expresses the opinion that improved methods of research will show it in even a higher proportion of cases. It was found in my own series in 2 of the 4 cases in which search was made for it. Robinson made blood cultures in 4 of 15 cases and recovered the meningococcus in 1 of these, and cites Gwynn, Salomon, Warfield and Walker, Lenhartz, Moller, Martini and Rhode as also isolating it from the blood. That it is not merely an agonal invader is shown by the fact that it has been discovered early in the disease—on the second and fourth days, on the tenth day before death, and, in my own case, on the fourth day of illness, a week before death. We have, then, in a certain number of cases of meningococcic meningitis, a genuine meningococcic septicemia, or “meningococcemia,” just as we see a pneumococcus or typhoid septicemia.

Ears.—Apparently but few of the ear complications of meningitis are due to the meningococcus, only 1 case (Elser) of the organism in middle-ear discharge being recorded. The frequency of ear trouble—65 per cent.—(Westenhoeffer) is evidently due to one of the more common microorganisms.

Postmortem.—The wide distribution of the meningococcus during life is still further emphasized by postmortem examinations. These have shown its presence in the cerebral and spinal meninges, of course; also in the pericardial fluid, in the endocardium, lungs, liver, spleen and joints, confirmatory evidence of a “meningococcemia.” In the meninges it occurs as a pure culture more frequently than in mixed infections.

Agglutination.—While comparatively few observations have been made on this phenomenon they are important as far as they go. Goodwin and von Sholly tested only a few patients, but, as a rule, got positive results. Von Lingelsheim obtained 146 positive results out of 420 tests in dilutions of from 1:10 to 1:200;

a dilution of 1:10 gave the largest number of positive results. Wollenberger got positive results in 7 out of 15 cases in dilutions of from 1:10 up to 1:60. Davis got positive results in all of 4 cases tested in dilutions of from 1:10 up to 1:50.

Thus agglutination of meningococcus by immune sera or by the sera of meningitic patients apparently does occur, and in suspected cases the test should be applied. Further observations are necessary, however, before we can determine the exact diagnostic value of the test.

The Pneumococcus.—Next in frequency to the meningococcus as a cause of meningitis comes the pneumococcus. Even epidemics of pneumococcus meningitis have been described by Parienski, Quadu and Weichselbaum. The proportion of cases of this type is variously estimated. Von Leyden gives it as 16 per cent. for epidemic cases, and 22 per cent. for sporadic. These figures are higher, I find, than the results based on all the cases collected, only 10 per cent. of these being of the pneumococcic variety. It apparently is not an infrequent form of meningitis. It runs a severe course and is almost invariably fatal. Polymorphonuclear cells in the spinal fluid are more numerous than in the meningococcic type, indicating its greater severity. It is generally secondary, only 9 cases of undoubted primary meningitis being recorded out of the 179 collected. Marechal, however, often found it primary. Libman, on the other hand, reports all his cases as secondary, and believes it to be extremely rare as a primary infection. He thinks the original focus is often obscure, and therefore frequently overlooked.

The pneumococcus undoubtedly gains access to the meninges in the same way as does the meningococcus. Its frequent presence in the throat and its wide distribution in the body are too well known to need comment. How contagious this organism is, is still a mooted point. It evidently has not as strong an affinity for the meninges as has the meningococcus, the proportion of cases of pneumococcic meningitis to the frequency of this organism in the throat being so small.

The Typhoid Bacillus.—Several instances of actual meningitis due to the typhoid bacillus have been recorded, though, as with the other severe complications of this disease, it is apparently more rare in children than in later life. It occurs evidently as a separate entity, Schottmuller having isolated Eberth's bacillus in

pure culture from meningeal pus in 2 cases with no signs of typhoid elsewhere. Faure and Laignel also found it at autopsy. Cole found typhoid bacillus in the spinal fluid of 8 cases of serous meningitis and in that of 1 case of a purulent nature.

Miscellaneous Organisms.—Meningitis due to other bacteria, streptococci, staphylococci, etc., does occur, but infrequently. Schottmuller has seen two epidemics due to the "streptococcus mucosus," and in all the cases the starting point was an otitis media.

A. Scheib describes a case of a baby dying on the eighth day of life without clinical symptoms, the autopsy showing a purulent otitis media and meningitis with the bacillus lactis aerogenes in the pus from the ears and meninges.

Symptoms.—The symptoms of meningitis are due to the presence of actual inflammation rather than to the organism causing the inflammation. Hence the clinical picture is practically the same in all varieties of the nontuberculous group. The pneumococcic type is, however, generally more violent in its course and is almost invariably fatal; whereas, in the meningococcic type, the mortality is estimated at from 50 per cent. to 60 per cent. The pneumococcic variety is often, in some respects, curiously like the infection of the lungs by the same organism. Herpes is a frequent sign in both diseases. Preble has reported a case of pneumococcic meningitis which ran a severe course and ended by a typical crisis with eventual recovery.

The different types of meningitis can be differentiated during life only by examination of the spinal fluid. It is of practical importance to determine the type, as the meningococcic cases should be reported and isolated. Whether or not infections by the pneumococcus, either of the lungs or meninges, should be isolated is still a mooted point. It is our practice at the Presbyterian and Cook County Hospitals to put in a room by themselves our children with pneumonia, and, I believe, the practice is a good one.

If treatment of cases of meningitis by injections of the homologous organism, the dosage based on the opsonic index, proves to be of value, lumbar puncture will become imperative in all cases, both to determine the type of organism present and to prepare the proper vaccine.

Conclusions.—Meningitis in early life is caused by a great

variety of microorganisms, chief among which in frequency are the "diplococcus intracellularis meningitidis," or meningococcus of Weichselbaum, and the pneumococcus of Fraenkel.

A large proportion of cases, especially in epidemics, is due to the meningococcus. A considerable number of cases, however, is due to the pneumococcus, variously estimated at from 11 per cent. to 22 per cent. in epidemics and higher in sporadic cases. Mixed infections are infrequent.

The meningococcus is very widespread in its distribution in the body. It gains access to the system through the nose and throat. It produces a true meningococcus septicemia, or "meningococemia."

The meningococcus is found in the nose and throat of healthy individuals living in close contact with meningitic cases of this type. Such individuals should be isolated, as by their presence abroad they help spread the disease.

The type of meningitis cannot be determined from the clinical picture. This can be done only by lumbar puncture. The prognosis in the pneumococcic variety is more unfavorable than in other types.

Meningitis due to almost all the known pathogenic bacteria does occur, but is infrequent. As the meningococcus is the only type which is really contagious, the throat and nose and also the spinal fluid of all cases should be examined to determine the variety present in order to protect the community. The meningococcic cases certainly should be quarantined, possibly also the pneumococcic.

I wish to express to my colleagues at the Cook County and Presbyterian Hospitals my thanks for their courtesy in allowing me to study the cases in their services. I am also under great obligations to Dr. Alec C. Soper, instructor in pediatrics at Rush Medical College, for much valuable help in the review of the literature.

439 North State Street.

LITERATURE.

- Achard & Laubry. *Gaz. Hebdomadaire de Médecine et de Chirurgie*, 1902, Vol. XLIX., p. 301.
 Andrews, F. W. *Lancet*, Vol. CLXX., p. 1,172.
 Barras. *Lancet*, 1904, Vol. II., p. 590.
 Berg. *Medical Record*, 1904, Vol. LXVI., p. 404.

- Bettencourt & Franca. *Zeitsch. f. Hyg.*, 1904, Vol. XLVI., p. 463.
- Boinet. *Archiv. Gen. de Méd.*, Paris, 1905, Vol. II., p. 2,008.
- Bolduan & Goodwin. *Medical News*, 1905, Vol. LXXXVII., p. 1,222.
- Boston. *Medical News*, 1900, Vol. LXXXVI., p. 566.
- Chaplin. *Medical News*, 1904, Vol. LXXXIV., p. 1,063.
- Councilman, Mallory & Wright. *American Journal Medical Sciences*, 1898, Vol. CXL., p. 251.
- Cupler. *Medical Record*, 1905, Vol. LXVIII., p. 815.
- Davis. *Jour. Infect. Dis.*, 1905, Vol. II., p. 602.
- Delcourt. *Presse Médicale*, 1904, Vol. LVI., p. 296.
- Drigalski. *Deut. Med. Woch.*, 1905, Vol. XXXI., p. 982.
- Elser. *Jour. Med. Research*, 1905-6, Vol. IX., p. 89.
- Elsner. *Medical News*, 1905, Vol. LXXXVI., p. 638.
- Eyster. *J. A. M. A.*, 1899, Vol. XXXIII., p. 187.
- Faure & Laignel. *Archiv. Gen. de Méd.*, 1904, Vol. I., p. 641, also Vol. II., p. 2,760.
- Flexner. *Jour. Exper. Med.*, 1907, Vol. IX., No. 2, p. 105.
- Freund. *Physician & Surgeon*, 1906, Vol. XXVIII., p. 425.
- Goodwin & Von Sholly. *Jour. Infect. Dis. Supplement*, February, 1906, p. 21.
- Gradwohl. *Philadelphia Monthly Medical Journal*, 1899, Vol. I., p. 361.
- Hastings. *Medical News*, 1905, Vol. LXXXVI., p. 1,110.
- Huber & Monroe. *Medical and Surgical Reports, Bellevue & Allied Hospitals*, 1904.
- Hunt. *Boston Medical and Surgical Journal*, 1906, Vol. CLV., p. 461.
- Jochmann. *Deut. Med. Woch.*, Vol. XXXII., p. 788.
- Kiefer. Quoted by Bolduan & Goodwin.
- Kirchner. *Berlin Klin. Woch.*, 1905, p. 708.
- Koplik. *Medical News*, 1901, Vol. LXXXVIII., p. 448.
- Krüber. *Muench. Med. Wochschrft.*, 1906, Vol. LIII., p. 1,714.
- Lenhartz. *Deut. Arch. f. Klin. Med.*, 1905, Vol. LXXXIV., p. 81.
- Libman. *Mt. Sinai Hospital Reports*, 1903, Vol. III., p. 546.
- v. Lingselsheim. *Deut. Med. Wochschrft.*, 1905, Vol. XXXI., p. 1,017.
- Lord. *Centrbltt. f. Bakteriöl.*, 1903.
- Mandoul. *La Presse Médicale*, 1905, Vol. XIII., p. 89.
- Manges. *Medical News*, 1904, Vol. LXXXIV., p. 913.
- Marchal. *Centrbltt. f. Bakteriöl.*, Vol. XXXII.
- Martini & Rohde. *Berlin Klin. Wch.*, 1905, p. 997.
- Mason. *New York Medical Journal*, 1906, Vol. LXXXIV., p. 921.
- Morse, J. L. *J. A. M. A.*, 1906, Vol. XLVI., p. 25.
- Osborne. *New York Medical Journal*, 1906, Vol. LXXXIII., p. 325.
- Ostermann. *Deut. Med. Wochschrft.*, 1906, Vol. XXXII., No. II.
- Peabody. *Medical Record*, 1905, Vol. LXVI., p. 735.
- Rabot. *Lyon Médical*, 1905, Vol. CV., p. 1,023.
- Robinson. *American Journal Medical Sciences*, April, 1906.
- Rolfe. *Lancet*, 1904, Vol. II., p. 590.
- Scheib. *Prag. Med. Wochschrft.*, 1900, Vol. XXV., p. 169.
- Scherer. *Centrbltt. f. Bakteriöl.*, 1895, Vol. XVII., p. 433.
- Schottmuller. *Munch. Med. Woch.*, 1905, p. 1,617.
- Tobler. *Jahrb. f. Kindhik.*, 1906, Vol. III., Hft. I., p. 1.
- Weichselbaum & Ghon. *Wein. Klin. Wochschrft.*, 1905, Vol. XVIII., p. 625.
- Westenhoeffer. *Berl. Klin. Wochschrft.*, 1905, p. 737.
- Wollenweber. *Deut. Med. Wochschrft.*, 1906, Vol. XXXII., p. 1,183.
- Wright & Archibald. *The Lancet*, June 30, 1906.

DISCUSSION OF THE PAPERS OF DRs. CHURCHILL
AND ADAMS.

DR. FITZ, Boston.—This report is a very important contribution to our knowledge of the subject. We are seeking for a possible bacteriological cause, and it is in line with what we may hope to find—a definite cause in an individual case. Perhaps now some one will be able to contribute a cure so that these cases will not turn out so unfortunately as most of them do.

DR. HENRY KOPLIK.—I have had one case similar to that of Dr. Adams's, of meningitis due to the influenza bacillus.*

DR. L. E. LA FÉTRA.—In regard to Dr. Churchill's paper, oftentimes more than one germ is present in these cases of meningitis. I had a case of tuberculous meningitis which had finally a terminal infection by the pneumococcus. Tubercle bacilli were found by lumbar puncture and at autopsy; after the child had had some acute symptoms, death resulted, and at the necropsy the pus from the meninges showed pneumococci.

In regard to Dr. Adams's case, this spring, in consultation with Dr. Fielder, I saw a patient who had had cough, fever and prostration with comparatively high temperature, and in addition swelling of the metacarpo-phalangeal joints of the right hand. Later the left wrist became swollen, and then the right hip and one of the vertebral joints. The child was sick for twelve days and died with no definite symptoms of meningitis. We had agreed upon the diagnosis of grip, but no lumbar puncture had been made and no withdrawal of joint fluid. But a very careful necropsy was made by Dr. Welch, of the Cornell Laboratory, and from all these joints, five in number, was obtained a pure culture of the influenza bacillus, absolutely no other organism being present. At the necropsy, examination of the brain was made, and from the sulci was obtained pus of similar character to that found in the joints. Moreover, the germs found by careful culture were also only those of influenza. This baby had had simply signs of great prostration; no signs of meningitis at all. It may be that the baby had meningitis from the beginning, but it was a most striking case of influenza bacillus septicemia with terminal meningitis.

DR. MORSE.—In Dr. Churchill's case of pneumonia, was the pneumonia proved to be due to the pneumococcus, and, if not, why might it not have been due to the meningococcus?

I am not convinced of the necessity of isolating patients with cerebrospinal meningitis, because it seems to me that clinical experience shows that the danger of contagion must be very slight. I was connected with the Boston City Hospital during the epidemic of 1898, and for several years afterward, and am also con-

* Dr. Heiman's article on Influenza, *New York State Medical Journal*, April, 1907.

nected with the Children's and the Infants' Hospitals. Cerebrospinal meningitis has been endemic in Boston since this time, and it is very seldom that there are not one or more patients suffering from this disease in all of these hospitals. Although they are treated in the open wards, no doctor, nurse or other patient, with the exception of one house officer, has contracted the disease during this time. This house officer was taking care of an especially sick patient and did not take proper precautions to avoid direct infection. Consequently, I cannot believe that the danger of contagion is very great.

DR. HAMILL.—I should like to refer to a case that was under my care several years ago and which I have not reported. It was one of tuberculous meningitis in which the bacillus was isolated from the cerebrospinal fluid, and which finally recovered (instances of recovery from tuberculous meningitis are very infrequent), retaining only a partial right-sided paralysis, which is gradually improving.

I should like to ask Dr. Churchill whether or not he has observed any reference in the literature to the length of time the meningococcus remains in the throats of those exposed to meningitis?

I do not agree with Dr. Morse's views regarding the isolation of these cases. It seems to me that the very reference he has made to the one case which developed in the Boston City Hospital emphasizes the importance of isolation. Furthermore, we are unable to definitely determine the limitation of the spread of this disease through the medium of the third person. It seems to me that, since we know that healthy individuals who have been exposed to meningitis are frequently carrying the meningococcus about in their mucous membranes, and since we have evidence to show that the organism finds its lodgment primarily in the nasopharynx and enters the system from there, we tread on dangerous ground when we oppose the isolation of these patients and their attendants. There is always the possibility that those who have been exposed may transmit this exceedingly fatal disease to others more susceptible than themselves.

I have observed the mixed infections on several occasions. A case was recently admitted to the hospital as a meningococcic infection. The first examination of the spinal fluid showed tubercle bacilli, and the second both tubercle bacilli and meningococci.

DR. JACOB.—It will be about time to isolate 75 per cent. of you gentlemen here if the presence of pneumococci or diphtheria bacilli or tubercle bacilli is to be a cause for isolation. We may as well all go into quarantine at once. We all have cocci or bacilli on our mucous membranes. I should, perhaps, insist upon the isolation of those persons who have catarrh, but every one else should go free. We go about, and every tuberculous patient

goes about, and those who at home are attending diphtheria patients go about without danger to others. We cannot destroy the whole social fabric in this way; that is my belief. We are full of bacteria, and it is impossible to isolate every one who has bacteria in the throat.

As far as pneumococci are concerned, a pneumococcic infection is often very violent, and looks very dangerous from the beginning; it will frequently invade at the same time the brain, the lungs, the pleura and the kidneys. I have just gotten through with such a case—a boy of sixteen, taken with violent chills, high temperature; he had pneumococcic infection in the lungs and pleura; he had acute nephritis and at the same time delirium, extending over five days and nights. He is getting well. Such cases will sometimes run a very rapid course. Dr. La Fétra will remember a case that was in the wards when he was associated with me—a case that was sent in as one of meningitis with violent convulsions, but we found very rapid respiration and decided to wait; there were convulsions and nephritis, and later a severe pneumonia of both upper lobes. The disease ran its course with high fever and convulsions lasting two days, and still the child got well. Elimination may be as good in these cases as in others, provided the kidneys were not diseased before. The same thing is true of diphtheria, in which the attending nephritis and albuminuria may run their course in a few days, terminating, as far as the action of the kidneys is concerned, in rapid elimination and speedy disappearance of albumin.

DR. CHURCHILL.—With regard to Dr. Morse's suggestion that the pneumonia might have been due to the meningococcus, it is, of course, possible.

With regard to Dr. Hamill's question as to the length of time that the meningococci had persisted in the throats or noses, I do not know. Neither can I find any instance of a case of meningococcic meningitis developing in a person having in a state of health these germs in the throat. The germs have been found as late as the sixty-seventh day of illness.

As to isolation, what Dr. Morse says about clinical experience is, of course, perfectly true and must have a good deal of weight. As I said in my paper, the question of whether we should isolate our cases of pneumococcic infections is still a mooted one. Personally, I think it better to keep them away from other patients. Of course, we can't shut up everybody who has a germ in his throat, as Dr. Jacobi says. As regards the people with meningitis and the people living with them, however, the point is this: we must admit that a certain number of these have meningococci in the posterior nares; furthermore, we must admit the terrible ravages of this disease; therefore, I think we should take every precaution possible to prevent its spread. I always ask myself, "Would you allow anybody living in the house of a patient with

meningitis to come into your house and play with your child?" I certainly would not.

DR. ADAMS.—I might apologize for having presented this case, but Dr. Thayer telephoned me that I had the honor of being the first in America to publish such a case. If Dr. Koplik has had such a case and has not reported it, I am not responsible.* But examination of the literature showed these cases as the only ones that we could find that had been published. A case similar to that reported by Dr. La Féra is in my list. I was somewhat dogmatic, perhaps, in insisting that there was nothing there but grip. I stuck to that, however, until the very last, when a lumbar puncture confirmed that diagnosis. The meningeal symptoms were very late in developing. At one time Dr. Thayer said that at Johns Hopkins they thought they had found a paratyphoid bacillus, but I received no further report as to that. Dr. Carroll and Dr. Rosenau both confirmed the opinion of Dr. Behrend. The fluid Dr. Thayer took to Baltimore, unfortunately, remained in the room for twenty-four hours, and we could not be sure that it was not contaminated; but Dr. Behrend took the fluid right from the room to the laboratory, and we could be absolutely sure that there was no contamination.

*After the meeting, Dr. Koplik wrote to me that Dr. Heiman had referred to his case in an article on Influenza in Children, published in the *New York State Journal of Medicine*, Vol. 7, No. IV., April, 1907, thus: "In one such case (*i.e.*, meningitis with influenzal origin) in Dr. Koplik's service at Mt. Sinai Hospital, influenza bacilli were found in the cerebro-spinal fluid." It is not usual to catalog such references, and the journal had not appeared at the Surgeon-General's Library when Dr. Willson examined the literature for me. I must, therefore, concede to Dr. Koplik priority in the publication of the fact that he had found the Pfeiffer bacillus in the fluid obtained by lumbar puncture during the life of his patient, but still believe my own case to be the first one reported by an American.

Neglect of Children and Consequent Mortality.—A few months ago Mr. George R. Sims contributed a series of articles to the *London Tribune*, dealing with the custom of women in London, and in other large British towns, taking young children and children in arms to saloons and giving them strong drink. These articles created a considerable sensation, and steps are being taken to prevent by legislation this custom. The fact is that the British people are becoming seriously alarmed at the great increase of mortality and deterioration among the young, and are beginning to recognize the true significance of this terrible wastage of child life.—*Journal of American Medical Association*, October 26, 1907.

PROTEID IN INFANT FEEDING: THE NECESSITY OF A STANDARD.*

BY THOMAS GRANT ALLEN, A.M., M.D.,

Professor of Diseases of Children, Post-Graduate Medical School,
Chicago.

The proteid has long been considered the most difficultly digestible constituent of cow's milk. It has been very generally held also by both the profession and the laity that it is this difficulty in digesting the proteids of cow's milk that causes most of the trouble when cow's milk is substituted for mother's milk.

That this view of the difficult digestibility of the proteid of cow's milk is not so commonly accepted by the profession to-day is, perhaps, not so generally known.

The reasons for placing the blame on the proteids are not far to seek. Has not the presence of the curds in the vomitus and in the stools of nearly every case of indigestion been convincing evidence of this to the mother as well as to the physician? To the physician this evidence was corroborated by the facts (1) that not only is cow's milk twice as rich in proteid, but that it contains three times as much casein or caseinogen, and (2) that cow's milk is intended to prepare the stomach and intestines of the calf for a tough food—grass or hay—and in the nature of the case must be expected to form a tough curd and therefore be difficult to digest.

It is now known that babies will digest buttermilk and skim-milk, that is, fat-free milk, with comparative ease, often without dilution, while when even a small amount of fat is added it will cause disturbance and the appearance of curds in the stools. It is also known that the fats of cow's milk differ materially from the fats of mother's milk, and that if the fat in the baby's food be greatly in excess of the proteid, then a large part of the fats will be excreted, usually as the insoluble salts of the fatty acids.

These and similar observations are gradually causing us to look upon fats as frequently the offending element. There is little doubt but that the fat is the cause of trouble quite as often as the proteid.

In the enthusiasm of the new knowledge of the rôle of fats, it is my opinion that many physicians are going to almost as unreasonable lengths in their fear of the fats as we used to go in the opposite direction in our fear of the proteids. They are feeding

* Read by title at the Fifty-seventh Annual Session of the Illinois State Medical Society at Rockford, May 21-23, 1907.

babies as though fats were the only cause of digestive and nutritional disturbances.

To make it easier to avoid the giving of too little or too much proteid by the establishment of a minimum and maximum standard is one of the objects of this paper. As I shall attempt to show, very grave evils have accompanied and followed our fear of giving too high a per cent. of proteid without any adequate regard for the daily amount of proteid. And now on account of an exaggerated fear of giving too much fat, some of us are, I believe, feeding too small an amount of fat and too large an amount of proteid.

THE RESULT OF GIVING TOO LITTLE PROTEID.

The various methods of modifying the proteids of cow's milk, namely: (1) diluting with water; (2) diluting with cereal water or cereal gruels; (3) partially predigesting and diluting, and (4) separating the casein by coagulation with rennet—these all, with the possible exception of the second method, in which a certain amount of vegetable proteid is added, partly making up for the dilution, had the effect of lessening the daily quantity of proteid given below the proper amount required for normal growth and development.

An examination of the schedules for feeding average healthy babies to be found in most books on infant feeding will show that the total daily amount of proteid during the first four or five months, judged by any reasonable standard, is generally too low. This is true, even though the schedule provides for more food than the baby is likely to take or so much that if the baby does take it all it can be predicted with certainty that sooner or later the baby will meet with a nutritional catastrophe. If, then, a food which, though excessive in quantity, provides too small a supply of proteid, is reduced in quantity so as to furnish not an excessive but a liberal amount of energy, it is clear that the proteid will be still further reduced and may be wholly inadequate for the needs of the baby.

As an example of what I have just said about schedules, one of these provides for a baby in the third month, when the average weight is about 11.5 pounds, an average daily quantity of 32 ounces of a milk containing 3 per cent. of fat, 1.25 per cent. of proteid, and 6 per cent. of sugar. This quantity of food would yield .40 of an ounce of proteid and 523 calories of energy.

To judge of the adequacy of this food, let us consider that a

liberal amount of proteid for a man weighing 150 pounds is 4.5 ounces, or .03 of an ounce for each pound of his weight, and that a liberal allowance of energy for such a man at moderate muscular work or at professional work would be 3,300 calories, or 22 calories for each pound of his weight.

In the case of the three-months-old child, it will be seen that the proteid quotient, that is, the proteid in hundredths of an ounce needed for each pound of the baby's weight, is about 3.5, and that the energy quotient, or energy in calories per pound of the baby's weight is 45.5. In other words, the proteid is only proportionately one-sixth more than an adult would require, while the energy is proportionately more than twice as much. Now the energy quotient for a babe may be as high as 45 for a short while, but cannot be maintained at that height for weeks at a time without the baby having serious nutritional disturbances. If the baby's proteid-containing structures—muscles, glands, etc.—did not grow, but remained stationary, then .03 of an ounce of proteid per pound, or a proteid quotient of 3, would maintain its proteid balance; but if we allow for the growth of muscles, glands and other proteid tissues we shall need about .04 of an ounce per pound as a minimum, that is, a proteid quotient of 4 at the least. If the baby's food were reduced in amount until the energy quotient were 40, which is a liberal amount for continuous feeding, it will be seen that the proteid quotient would be only 3, or just sufficient to maintain a stationary weight, but would allow nothing for growth.

Many other instances could be shown in which schedules provide for the feeding of as little proteid proportionately as for an adult, or even less, at the same time providing for twice as much or more than twice as much energy. I give just a few, and these are, as schedules go, by no means bad in comparison in this respect:—

1. A baby in the fourth week, when the average weight is 8.25 pounds, is to receive 22.5 ounces of a 3—1—6* milk. This would give a proteid quotient of 2.75, or less than enough to maintain the proteid balance so that the proteid tissues of the body would undoubtedly lose in weight, though the fat and other tissues might gain more than enough to offset this loss. Right here is seen how inadequate may be the gain in weight as a crite-

* By this is meant a milk containing fat, 3 per cent.; proteid, 1 per cent., and sugar, 6 per cent.

tion in helping us to determine the health of a child and whether he is being properly fed. The energy quotient would be 44, about the maximum for a baby and a dangerous quotient to maintain, being twice that of an adult man.

2. A baby in the fourth month, when the average weight is about 13 pounds, is to receive 30 ounces of a 3.5—1.5—7 milk. This would furnish a proteid quotient of 3.5 instead of the normal minimum of 4 required for growth, and an energy quotient of 43.5, which is rather high if continued.

The dilution of milk is usually a proper procedure and generally would do no harm did we take the precaution to control the total amount—measured before the dilution—given in the twenty-four hours; for instance, if a baby requires .40 of an ounce of proteid in a day the important thing is that it gets 10 ounces of milk. Whether this is fed in a 20-, 30- or 40-ounce mixture is of far less importance. The dilution will depend on the baby's digestive ability.

But I have said the practical result of this fear of giving too strong (not too much) proteid was the giving of far too little proteid.

Now, as nothing else can take the place of proteid in promoting the growth and replacing the nitrogenous waste of the cells of the body, upon the healthy condition of which the digestion and assimilation of not only the proteid, but the other elements of the food depend, it is clear that an inadequate supply of proteid must result in loss of resisting power.

We know from experiments on young, growing animals that a low proteid diet results in an insufficient supply of blood, weak, soft, small muscles, weak bones and loss of resistance to disease.

There is little doubt but that a very large amount of the anemia, loss of strength, tendency to rickets, general failure of nutrition, and the loss of the resisting power that we so often see, is due to too little proteid; not necessarily to too small a percentage, but to too small a total in the day. This it is that so often accounts for the fact that a baby, plump and fat, but lacking strength and blood, succumbs so readily to an apparently slight illness.

It is coming to be recognized that the terrible mortality from the diarrheal diseases among artificially-fed infants is not entirely due to contaminated or chemically changed milk, but that the bad milk is often only the final stress put upon an organism already

debilitated by the long-continued use of a food deficient in its most important constituent—the proteid.

The fact that infants apparently thrive and gain in weight on a low proteid diet for a while when the other elements are in abundance has misled us into being satisfied with a low proteid diet, until too late we realize that we have allowed an irreparable injury to be done to a little baby during the period in which it is most susceptible to such an injury—the period of its most rapid growth.

To my mind, therefore, there is nothing more important for the physician to rid his mind of than this fear of proteid, and nothing more important for him to acquire than the habit of asking himself how much proteid is the baby getting daily, and how much he should get. Not what per cent., though this question may be necessary to avoid giving the proteid too strong, but what should be the daily quantity of proteid.

DO BABIES EVER GET TOO MUCH PROTEID?

Seldom is too much proteid fed in the early months of infancy, for by the European plan of diluting milk in the first four months it is very unusual for the baby to get more than the necessary amount; and by the American or percentage plan, as I have tried to show, so much stress has been put on the necessity of low proteid percentages that rarely does the baby get enough. Holt and others have warned against continuing a low proteid percentage, but it must be admitted that the greater emphasis has been on the danger of giving too strong proteids, and it is therefore quite natural for the warning against continuing the low proteid diet to be more or less unheeded. As an example of this it is no unusual thing to see a baby at the end of the third or fourth month still being fed a milk in which the proteid is as low as 1.25 per cent. A baby weighing 12.5 pounds would need to take 40 ounces of this milk in order to get a proteid quotient of 4, which is our minimum standard for growth. If the baby should weigh as much as 16 pounds, which is by no means unusual for this age, it would need to take over 50 ounces of this 1.25-per-cent. proteid milk in order to get a proteid quotient of 4.

On the other hand, after the eighth or ninth month, it is very common to feed large amounts of proteid. It is not uncommon to see 40 ounces of a 3-per-cent. proteid milk fed to a baby weighing 16 pounds, that is, nearly .075 ounce of proteid for each pound of the baby's weight, or a proteid quotient of 7.5. This is

at least 50 per cent. more than a liberal allowance, nearly twice as much as is absolutely necessary, and furnishes at least 25 per cent. more than can be used. This latter, the unused portion, is detrimental in that it has to be broken down into lower nitrogen compounds and excreted from the system, thereby unnecessarily overworking the organs of excretion.

Frequently one sees as high as 40 ounces of a 4-per-cent. proteid milk prescribed for a baby less than a year old, and weighing say 20 pounds. This is 1.6 ounces of proteid, or .08 of an ounce per pound—an excessive amount when compared with the 4.5 ounces or .03 of an ounce per pound required by an adult man. Allowing two-thirds more for the relatively larger amount called for, because the child is growing, while the adult has attained his growth, 1.6 ounces or a proteid quotient of 8 is still immoderately high, being 60 per cent. higher than this very liberal allowance and more than 150 per cent. higher than a liberal allowance for an adult.

While the results of feeding excessive proteid are not so serious as those which follow the prolonged feeding of an insufficient amount, yet the metabolic disturbances and the unnecessary work that is forced on the liver and kidneys by a high proteid diet must, at the very least, prove a most serious handicap for the baby.

THE RESULT OF FEAR OF FATS—TOO MUCH PROTEID.

In the last year or two perhaps the commonest cause of excessive proteid feeding has been the fear of giving too much fat, and the consequent skim-milk, buttermilk, or fat-free dieting. The fat furnishes so large a proportion of the energy—one-half of that of an ordinary good milk, whole milk yielding 20 calories per ounce, while an ounce of skim milk yields but 10 calories—that in giving skim milk we must feed such a large quantity of it in order to supply the necessary energy that the total proteid is necessarily large. For example, suppose a baby ten or twelve weeks old and weighing 12 pounds is fed sufficient skim milk and sugar to furnish 480 calories—energy quotient 40. This would require 35.5 ounces* of skim milk with a sugar percentage of 7. Now 35.5 ounces of skim milk will supply 1.4 ounces of proteid. If an adult were fed proportionately he would receive 18 ounces of proteid in the day; or to make another comparison, 1.4 ounces

* The caloric value of 1 ounce of skim milk is 10, and of 3 per cent. of an ounce of sugar (7-4) is 3.5 $480 \div 13.5 = 35.5$.

of proteid for a 12-pound baby gives a proteid quotient of 12—enough for two or three such babies.

The immediate effect of too much proteid and little or no fat may not be bad any more than the immediate effect of deficient proteid and abundant fat or sugar; but the ultimate effect of such a fat-free, high-proteid milk, unless frequently interrupted, must of necessity be injurious.

STANDARD MINIMUM AND MAXIMUM DAILY PROTEID.

How shall we avoid giving too little or too much proteid? Manifestly by having a proper standard and then making the proteid content of the food conform to this standard. The minimum standard may be defined as an amount of proteid just sufficient to provide for the cell-growth and cell-repair in the tissues of the infant.

How shall we obtain the data necessary to determine such a standard? The three following ways suggest themselves:—

1. We might determine the nitrogen waste in the urine of babies fed first on a proteid-free diet, then the nitrogen excreted when the babies are fed on varying amounts of proteid. The proteid equivalent—nitrogen $\times 6.25$ —of the nitrogen excreted when the diet is proteid-free is the proteid balance, the proteid required to repair the cell-waste, and to prevent loss in weight. The difference between the proteid ingested and the proteid equivalent of the nitrogen excreted when varying amounts of proteid are given represents the minimum proteid necessary for cell-growth. The sum of these two, the proteid balance, and the minimum amount of proteid necessary for cell-growth, would be the least quantity it would be safe to continuously provide for the baby and might be called the minimum daily proteid.

To make my meaning clearer, suppose a baby is fed on a proteid-free diet and excretes .1 ounce of nitrogen, the equivalent of .65 of an ounce of proteid, and that the same baby on a .65 ounce proteid diet excretes just the same amount of nitrogen as when the diet was proteid-free, and when the proteid ingested is raised to .75 ounce and then to .85 ounce the proteid equivalent of the nitrogen excreted is still only .65 ounce, but when the quantity ingested is further increased to .95 ounce, then the amount excreted is found to be .75 ounce. From this data we would very properly consider that .65 ounce proteid is the amount required to repair the waste, that .20 ounce is the amount required for growth and that .85 ounce is the minimum daily proteid.

The many and great difficulties in the way of this method have so far not given results that can be relied on. I have depended upon a combination of the two methods, which I shall now describe.

2. The proteid balance for an adult man is well known, being, as has been already intimated, about .03 of an ounce for each pound of the body weight, or, let us say, a proteid quotient of 3. Allowing a growing child one-third to two-thirds more than this, we would fix the minimum proteid quotient at 4 and the maximum at 6.

3. The study of a number of cases in which the weights of the babies, the quantities of milk taken in the day, and the proteid content of this milk were all carefully recorded would furnish a pretty fair working standard, especially if this standard is in reasonable accord with that obtained by the second method. Fortunately, we have now quite a large number of breast-fed babies in which these data have been carefully made and recorded for months. These data I have averaged and arranged in the following table, making only such changes as seemed desirable in the feeding of cow's, rather than mother's, milk—these changes being the lessening of the proteid slightly in the first two weeks and modifying the proteid per cent. and the quantity of milk in the later months, but in no way disturbing the average daily proteid.

TABLE SHOWING DATA USED IN AN ATTEMPT TO ESTABLISH A
STANDARD MINIMUM DAILY PROTEID QUOTIENT.

Age.	Daily quantity. Ounces.	Proteid per cent.	Daily proteid. Ounces.	Weight in pounds.	Proteid quotient.* Ounces per pound.
1st week.....	12	0.75	.09	7	.01 to .015
2d week.....	18	1.00	.18	7.25	.02 to .025
3d week.....	20	1.25	.25	7.50	.03
4th week.....	21	1.50	.31	7.75	.035
2d month.....	24	1.50	.36	9	.04
3d month.....	28	1.50	.42	11	.04
4th month.....	30	1.75	.52	13	.04
5th month.....	32	2.00	.64	15	.04
6th month.....	36	2.00	.72	16	.045
7th month.....	38	2.00	.76	16.75	.045
8th month.....	40	2.00	.80	17.50	.045

*The proteid quotient is in hundredths of an ounce per pound of the baby's weight.

The proteid quotient for the first week is seen to lie between 1 and 1.5, for the second week between 2 and 2.5, and for the third week between 3 and 3.5; that is, the proteid quotient for the first three weeks is approximately the number representing the week of the baby's age. Thereafter the proteid quotient is approximately 4. This it will be noticed agrees very closely with the result obtained by the second method when we add one-third to the proteid quotient of an adult to allow for the greater cell-growth and cell-activity in the child.

A PRACTICAL APPLICATION OF THIS MINIMUM DAILY STANDARD.

Having established a standard, how shall we make our application of it simple and practical?

One ounce of good* milk contains 4 per cent. of proteid, or .04 of an ounce. Therefore our standard minimum daily proteid will be supplied by 1 ounce of good milk for each pound of the baby's weight, and our maximum daily proteid quotient, which we placed at 6, is supplied by 1.5 ounces of milk.

This application of the minimum and maximum daily standards—1 ounce of milk for the minimum and 1½ ounces for the maximum—holds good whether the milk used be whole milk, skim milk, buttermilk, top milk, or a mixture of cream with either whole milk or skim milk—in fact, for any undiluted milk.

5661 Washington Avenue.

* The proteid in milk will, in general, nearly equal the fat up to 4 per cent. If the milk contains more than 4 per cent. fat, it will usually contain less than 4 per cent. of proteid.

Purulent Conjunctivitis in a Baby Born after Cæsarean Section.—Terson (*Ann. d'Oculist.*, July, 1907).—The section was performed at term without accident. As soon as the baby's head appeared in the uterine incision, it was noticed that the eyes were red, swollen, and secreting. Terson saw the case soon after the operation and found that the baby was affected with a very intense purulent ophthalmia of both eyes. By treatment with silver nitrate and permanganate the disease was cured in about ten days without corneal complication. The organisms found were staphylococci, together with an organism resembling the micrococcus tetragenus.—*Interstate Medical Journal.*

VARIATION IN FAT-CONTENT OF COW'S MILK.*

BY E. H. BARTLEY, M.D.,

Brooklyn.

A STUDY OF THE FAT IN CERTIFIED MILK DELIVERED IN BROOKLYN
DURING 1906.

Home modification of cow's milk for the preparation of infants' food is the most popular method of the present day.

The problem of securing pure, clean, cow's milk has been practically solved by the Milk Commission.

It is now time to secure, if possible, more uniformity in the composition of the milk than we have heretofore obtained. While absolute uniformity in composition is not essential to fair success, very wide variations from day to day are undesirable and sometimes disastrous. Fortunately, normal infant digestion is elastic enough to accommodate itself to very considerable variations without serious disturbances of function. Some infants, on the other hand, are sensitive to these variations, especially in the fat and proteids.

In nine analyses of human milk upon which nurslings thrive, Harrington gives the variation in fat from 2.09 to 5.16 per cent. The sugar varied from 5.68 to 6.7 per cent., and the proteid from 1.08 to 4.14 per cent. In these analyses a high per cent. of fat was accompanied by a high per cent. of proteid and *vice versa*, i.e., when the fat was 5.16 per cent. the proteids were 4.14, and when the fat sank to 2.09 the proteids sank to 1.08. In other words an infant will tolerate rather wide fluctuations in the composition of its food, provided the normal relative proportion of the constituents is maintained, and the composition is about the same from day to day.

Carter and Richmond have published a considerable number of analyses of mother's milk on which nurslings sickened, which confirm in a striking manner the truth of the above generalization. The analyses show that when any of the nutrient constituents of mother's milk is either high or low the milk disagreed. A low fat and a high proteid, high fat and low proteid, high fat and low sugar—all proved deleterious. A high proteid with low fat was much worse than when the fat was fully up to, or above, normal. Low fat and low proteid with a high per cent. of sugar did not nourish the baby. In general, the study of mother's milk emphasizes the importance of the relative proportions of the fats, carbohydrates and proteids, and I have

* Read before the Section on Pediatrics, New York Academy of Medicine, April 11, 1907.

elsewhere pointed out the importance of the relative proportions of casein and albumin.*

This principle is one of the strongest arguments for the milk laboratory, in which these proportions can be maintained at will day after day. Having observed, in infants fed upon modified milk, disturbances on certain days, which were not seen on other days, it occurred to me that perhaps there were certain variations in the fat on certain days which might account for this. I began to study the variations in the fat of the milk served from one dairy, and soon found greater variations than I had supposed to exist, and I thought the results of this study might be worth recording.

In spite of the variations occasionally seen in mother's milk, we believe that there is reasonable constancy in the milk of each individual mother from day to day, and it is logical to suppose that such a constancy in the relative proportion of the constituents of an infant's food is desirable, even if *not* absolutely essential. With these thoughts in mind, I have tabulated the results obtained in the weekly estimations of the fat as furnished by the chemist, Dr. Moak, in the certified milk sold in Brooklyn during the year 1906. This milk is furnished by eight farms and is sold by eight dealers. The examinations are so conducted as to show the name of the dealer as well as the farm where the milk is produced and bottled. I have tabulated the farms only, and have lettered, instead of naming them, selecting only those which have continued to furnish certified milk throughout the year.

I have given in Table I. the results by months, which is the average of from four to six estimations each month. I have given the average for the month, the maximum, the minimum and the variation between the highest and lowest.

It will be seen that the greatest variation in any month is 2 per cent. One per cent. is not unusual. These variations are partially accounted for by the creaming of the milk in the filler, and probably, also, by the fact that some of the dairies have two or more breeds of cows in the same herd. It is well known that Holstein cows give a milk relatively poor in fat, while Jerseys and Guernseys give a milk relatively rich in fat. As the feed and care of a given dairy are the same, this element does not enter into the question. The effect of these variations in fat is ren-

* *Brooklyn Medical Journal*, May, 1900.

TABLE I.

DAIRY. 1906.	A		B		C		D		E		F		G	
	Ave. Max.	Min. Var.	Ave. Max.	Min. Var.	Ave. Max.	Min. Var.	Ave. Max.	Min. Var.	Ave. Max.	Min. Var.	Ave. Max.	Min. Var.	Ave. Max.	Min. Var.
January.....	5.5	6. 5. 1.	5.2	5.4 4.8 .6	4.9	5.4 4.5 .9	3.9	5. 3.1 1.9	6.1	6.8 5.8 1.	4.4	4.7 4.2 .5	.....	.....
February.....	5.6	5.1 4.3 .8	4.7	4.6 4.1 .5	4.3	4.7 4.2 .5	4.4	6.4 5.4 1.	5.8	6.2 5. 1.2	4.8	5.2 4.5 .7	.....	.....
March.....	5.6	5.7 5.5 .2	5.1	5.6 4.8 .8	4.2	4.6 3.8 .8	4.5	5. 4. 1.	5.5	5.7 5.1 .6	4.6	4.8 4.4 .4	4.6	5. 4.1 .9
April.....	5.6	6. 5. 1.	4.7	5.3 4. .9	4.3	4.7 3.8 .9	4.3	4.8 3.8 1.	5.2	6. 4.6 1.4	4.8	5. 4.6 .4	4.4	5. 3.8 1.2
May.....	5.5	5.6 5.2 .4	4.9	5.2 4.2 1.	4.4	4.7 4. .7	4.1	5. 3.4 1.6	4.9	4.9 4.6 .3	4.4	4.9 4. .9	4.8	5. 4.6 .4
June.....	5.8	6.7 5.2 1.5	5.1	5.6 4.6 1.	4.6	4.7 4.3 .4	4.5	5.1 4.1 1.	4.8	5.1 4.4 .7	4.5	4.9 4.3 .6	4.8	5.3 4.3 1.
July.....	5.3	5.7 4.8 .9	5.1	5.4 4.6 .8	4.7	5.1 4.3 .8	4.3	4.6 3.8 .8	4.9	5.4 4.4 1.	4.7	4.9 4.3 .6	4.8	5. 4.4 .6
August.....	5.6	6.6 4.5 2.1	4.5	4.9 4. .9	4.4	5.2 3.8 1.4	4.2	4.8 3.8 1.	4.6	5. 4.2 .8	4.7	5.3 4.3 .1	5.1	5.6 4.5 1.1
September.....	5.3	5.2 4.8 .4	4.5	5. 4.4 .6	4.7	5. 4.5 .5	4.5	5. 3.7 1.3	4.9	5.6 4.5 1.1	4.5	4.7 3.6 1.1	4.8	5. 4.5 .5
October.....	5.4	5.6 5.2 .4	4.9	5.3 4.2 1.1	4.4	5.1 4.5 .6	4.2	4.6 3.8 .8	5.2	5.3 4.9 .4	4.5	4.8 4.2 .6	4.9	5.6 4.5 1.1
November.....	5.6	6. 5.2 .8	4.9	5.2 4.6 .6	5. 5.6	4.3 1.3	4.8	5.2 3.8 1.4	5.6	5.8 5. .8	5.2	5.4 4.6 .8	4.6	5.2 4.2 1.
December.....	5.8	6. 5.2 .8	4.8	5.2 4.4 .8	4.9	5.3 4.6 .7	4.4	5. 3.8 1.2	5.6	5.8 5. .8	4.9	5.5 4.6 .9	5.3	5.6 4.5 1.1
Total number of counts.	52		51		49		129		52		51		51	
Bacteria per 1 c.c. Average for the year.	5,107		854		6,080		3,517		11,264		8,685		10,040	

Bacterial counts, average for year, 6,936 per 1 c.c.

dered more evident when we estimate the fat in the top milk produced by these milks. I have also had the fat determined in 25 samples of milk bottled at the farms, and with it the fat in the top 8 ounces and also in the skim milk as bottom milk. The results are given in Table II.

In one instance, February 19th, ten bottles were taken, one from each of ten crates, from a single day's supply from the same farm and shipped in the usual way.

TABLE II.

The amount of fat in whole milk, skim milk and top milk with variations observed:—

Date, 1907.	Dairy.	Whole Milk.	Skim Milk.	Top 8 Ounces.
February 11th	B	4.8		16.0
" "	"	4.8		16.0
" "	"	4.8		16.0
" "	"	4.8		15.0
" "	"	4.7		16.0
March 20th	"	5.8	.6	21.0
February 16th	D	3.2	.325	13.5
" 17th	"	4.2	.5	16.5
" "	C	5.0	.5	18.5
" 16th	H	4.2	.2	17.5
" "	"	5.1	.2	21.1
" "	"	4.2	.3	16.0
" "	"	4.2	.3	16.5
" "	"	4.2	.25	16.5
" "	"	4.0	.15	17.0
" "	"	4.0	.25	16.5
" 17th	"	4.2	.40	16.0
" "	"	5.6	.6	21.0
" 19th	"	5.1	.4	17.5
" "	"	4.4	.5	16.5
" "	"	4.0	.3	16.5
" "	"	5.2	.4	20.0
" "	"	4.4	.3	16.5
" "	"	4.2	.4	16.0
" "	"	4.1	.3	16.0
" "	"	4.9	.3	19.5
" "	"	3.9	.3	15.0
" "	"	4.3	.4	17.0
" 21st	"	4.1	.2	16.0

The average of the whole milks which gave between 4 and 4.4 per cent. of fat gave 16.3 per cent. of fat in the top 8 ounces dipped off with the Chapin dipper.

Those milks which contained from 5 to 5.2 per cent. of fat gave a top milk containing an average of 19.5 per cent. of fat.

It will be seen that the fat in the ten bottles of February 19th varied from 4 per cent. to 5.2 per cent., and the fat in the top 8 ounces varied from 16 to 20 per cent.

Incidentally it will be observed that the 4 per cent. milk gave about 16 per cent. of fat in the top 8 ounces, which is 2 per cent. higher than I have heretofore found it to be, and higher than it has generally been stated to be. This means that we have been feeding our infants with a larger percentage of fat than we have intended to, or thought we were feeding.

The effect of this is that when we thought we were feeding 2.8 per cent. of fat we were actually giving from 3.3 to 4.2 per cent. of fat. When we thought we were giving 3.5 per cent. we were actually giving from 4.1 per cent. to 5.2 per cent. The difference between 3.5 and 5 per cent. fat in a baby's food is a matter of no small importance, and probably accounts for some troubles that we have seen on certain days and which we could not explain. The chart shows that the variation in the same day from the same farm is from 1 to 1½ per cent. of fat in the whole milk. If the amount were uniform from day to day, we could adjust it to the needs of the infant; but when we use 15 per cent. top milk on one day and 20 per cent. top milk the next, serious disturbance may result. There is manifestly a necessity for some means of securing a more uniform milk than these figures show.

The cause of the variation may be in the methods used in bottling, or it may be in the breed of the cows in the stable.

By proper mixing of these milks an average milk of a medium amount of fat can be obtained. Where milk is bottled at a creamery, with the ordinary filling machine holding a large amount of milk, and care is taken to stir the milk occasionally during the process of filling, great variations in the amount of fat may be avoided. But when the filling of the bottles is done at the farm, greater care is necessary to secure reasonably uniform results. In actual practice we find the milk thus bottled to present rather wide variations in the fat content, as shown by the results of these examinations. These results are presented here not to

throw any discredit upon the process of home modification of cow's milk, but to suggest that some efforts be made to correct a manifest defect in the handling of the milk. How is this to be done? There should be more care exercised in mixing the whole product of the milking before bottling. This is of especial importance where there are several breeds of cows in the dairy. Even with this precaution there will be a difference in the fat contents of different dairies. The only way to obviate these sudden and great variations is to standardize the milk. This should be done with as little manipulation as possible, and may necessitate a return to the practice of bottling at the creamery instead of at the farm. In either case, it will be necessary to have frequent estimations of the fat from each dairy, and point out to the dairymen how to mix the milk from the various cows to secure about the right composition. I believe this would be a more satisfactory method than that sometimes adopted, of separating and recombining the skim milk and cream. This latter method is the one used under the direction of the Philadelphia Pediatric Society's Commission. They allow a variation of 0.5 per cent. on either side of the advertised percentage of fat. They certify two grades of milk, namely, 4 per cent. and 5 per cent. milk, and also cream. For infant feeding I prefer a 4 per cent. rather than a richer milk. It seems to me feasible to have a dairy produce a milk that will contain between 4 and 4.5 per cent. fat without unnecessary manipulation or trouble, by mixing the milk of selected cows.

Experience with Oil of *Chenopodium* in the Treatment of *Ascaris* in Children.—Brüning (*Deutsche medizinische Wochenschrift*) has subjected the American oil to tests in a series of 20 cases and found that it is very efficient in the treatment of the condition noted. Depending on the age of the child, the dose varies from 8-15 drops three times daily, followed by a cathartic. It seems that one treatment is sufficient for most cases. The worms are apparently not killed by the oil, but merely narcotized, so that the administration of the cathartic is most important. The author believes that the efficient action of the remedy resides in an ethereal oil of the following composition: $C_{10}H_{16}O_2$. Experiments have shown that the same effect may be obtained with the latter as with the ordinary oil.—*Medical Record*.

A CASE OF VOMITING, WITH ACETONURIA AND FATTY METAMORPHOSIS OF THE LIVER.*

BY ALBERT WILLIAM MYERS, M.D.,

Chicago.

The patient, Harold N., aged nine months, had been admitted to the hospital in poor general condition after the death of his mother from some unknown cause. His father, a very intemperate man, was once in an insane asylum. There are six older brothers and sisters living and well. The child was breast-fed for a few months, then the bottle was given with unsatisfactory results. After his admission it took much time and experimentation to get him on a suitable food, but after the twelfth month he progressed steadily. Although fat and strong looking during his second year, he was easily upset and a slight cold or a transient digestive disturbance would be accompanied by a marked elevation of temperature, usually with delirium. At the age of eighteen months he passed through a severe attack of croupous pneumonia, but made a perfect recovery. From that time until two weeks before his death he seemed to be in good physical condition, although a little "queer" mentally.

About the middle of March a severe vomiting attack occurred which lasted three days. His diet had always been carefully regulated in the institution; he had never been given whole milk, for the milk supplied the Home is from a Guernsey herd and averages about 5 per cent. fat. On this account it is diluted at least one-fourth, even for the older children. The only change detected in his diet was that during two or three days preceding the beginning of the vomiting he had eaten pieces of bread and butter several times a day. It is possible that in this same period he may have got some whole milk, but this could not be determined.

The vomiting was of the type seen in cases of recurrent vomiting, frequently repeated in spite of the withholding of all food, and unaccompanied by abdominal pain or distention. The temperature was very slightly elevated, there was no icterus, and the tongue

* Read before the Chicago Pediatric Society, April, 1907.

was clean. The child preferred to lie in a quiet room, was irritable when disturbed, but not delirious. There were marked prostration and rapid wasting. The breath had a heavy acetone odor and the reactions for both acetone and diacetic acid in the urine were very marked. A slight trace of albumin was present and the acidity of the urine was very high.

The stomach and bowels were washed out, all food was withheld, and sodium bicarbonate, in moderate doses, was given with good results. After a few doses, vomiting ceased and the return to an almost normal condition was rapid. The expression about the eyes became more natural, the cheeks filled out, and the character of the stools was good. On the other hand, his appetite was not so good as usual and his former energy and high spirits did not fully return.

The food given for the first day or two after the vomiting ceased consisted of cereal decoctions and whey. Milk was added gradually, but it was being diluted still about one-third when the final disturbance took place, ten days after the original attack.

An examination of the urine, made on March 21st, showed no acetone, no diacetic acid, no albumin.

On the 25th of March he vomited on awaking. He was at once placed on barley water and whey feedings and no more vomiting took place that day. The temperature was normal. When seen on the 26th his temperature was normal, his tongue clean, his chest and his abdomen negative, except for some enlargement of the liver, which extended 2.5 cm. below the costal margin in the right mammillary line. There was no jaundice. The most noticeable thing about him was the wild, almost maniacal, expression of his eyes and the occasional inarticulate cries which he uttered without any apparent cause.

During the day he did not vomit and his bowels moved normally, but his mental state became steadily more excited. About 10 P.M. he is said to have had a brief unilateral convulsion. Seen half an hour later, he was lying with his legs quiet, but not paralyzed, while his clenched hands and flexed forearms were in a state of constant agitation, suggesting the movements of paralysis agitans, but of a very much more energetic type. Occasionally, these would cease and the arms would be moved about freely, showing that there was no loss of power in them. The chin and tongue were also in a state of constant irregular

motion, which ceased when attempts at swallowing were made. The pupils were equal and reacted normally, but lateral nystagmus was present and internal strabismus appeared shortly after this time.

The respirations were shallow, hurried and jerky, and the heart's action was very rapid and rather weak. Apparently, consciousness was preserved.

The cardiac and respiratory weakness increased, the movements continued, but became less forcible, and finally, about four hours later, death occurred. Shortly before death the temperature went up and the child vomited a small amount of altered blood, the only vomiting that had taken place since the early morning.

A full autopsy was not permitted, and it was possible to examine only the liver. Exploration of the abdominal cavity through the opening made showed the stomach to be full of altered blood similar to that vomited just before death. In other respects nothing abnormal was found except the liver. This organ extended an inch below the costal margin and presented to a marked degree the yellowish, fawn-colored appearance of extensive fatty change, resembling especially the condition described in the cases of late chloroform poisoning. The tissue of the liver was quite friable, almost completely bloodless on section, and presented a uniform yellowish coloration. An unusually strong odor was present, but it was not that of acetone alone; perhaps acetone combined with some of the fatty acids.

Sections of liver tissue stained with Sudan III. and hematoxylin show very beautifully an extreme degree of fatty infiltration. The fat is pretty evenly distributed, but is, perhaps, a little more abundant in the periphery of the lobules. Nuclei of connective tissue cells are prominent about the portal spaces, but there is no increase of connective tissue. There are no areas of focal necrosis. In the section stained with hematoxylin and eosin the cell-outlines are indistinct, and throughout the whole section the cells have a thin-walled, bladder-like or signet-ring appearance on account of the crowding of the nuclei to the periphery by the accumulations of fat here shown as vacuoles.

We have here a reasonably healthy boy of two years with no evidence of infection, no change in surroundings, and very little change in diet, beyond a slight increase in fat, who develops a se-

vere vomiting attack, associated with acetone and diacetic acid in the urine. Apparent recovery follows. Ten days later, in spite of careful feeding, a condition of profound intoxication develops, leading rapidly to a fatal termination with marked nervous symptoms. Some enlargement of the liver is present, and at the post-mortem an extreme fatty metamorphosis of this organ is found.

While it is probable that cases of such severity as this are rare, the author is convinced that the minor degrees of this condition are frequent, especially among the children of families in good circumstances, where too much and too rich food is the rule. In young children it may be only the use of too rich a milk or too large a quantity of beef juice that is at fault; or, again, it may be due to too frequent feedings. The attacks are often precipitated by fatigue or overexcitement.

It has been stated that the appearance of acetone in the urine in these attacks is the result of the temporary tissue starvation caused by the persistent vomiting. If this were the case the acetone ought to be small in amount at the beginning of these attacks and steadily increased until feeding is resumed. This does not agree with the experience of the author. From a rough estimation of the quantity of acetone by a comparison of the intensity and extent of the color layer at the point of contact, it would seem that the acetone content of the urine is highest early in the attacks and diminishes greatly or disappears before feeding is resumed.

It is perfectly true that acetone is found in the urine in a great variety of conditions, but its occurrence in digestive disorders is certainly of some value as a sign of liver insufficiency, and the case reported here seems to show that it may be a danger signal calling for more prolonged watchfulness than is ordinarily given.

Formula for Pharyngitis and Aphthous Sore Mouth.—

R̄ Tincturæ myrrhæ	20.0 grams
Tincturæ opii camphoratæ	5.0 "
Mel. rosæ	30.0 "

M. Add to barley water 150 grams and use as a gargle for aphthous inflammation of the mouth and throat.—*Journal de Médecine de Bordeaux*, May 5, 1907.

ESTIVO-AUTUMNAL FEVER IN A CHILD TWO AND ONE-HALF YEARS OLD.*

BY RALPH OAKLEY CLOCK, M.D.,

Chief Resident Physician at St. Christopher's Hospital for Children,
Philadelphia.

During a period of four and one-half years at the Johns Hopkins Hospital, Thayer and Hewetson observed 616 cases of malarial fever, including the tertian, quartan, and estivo-autumnal varieties. Of these, only 18 cases were under ten years of age—less than 3 per cent. On account of the comparative infrequency of estivo-autumnal fever in children, this case seems worthy of being placed on record, and I am indebted to Dr. M. P. Boyle for the privilege of reporting it.

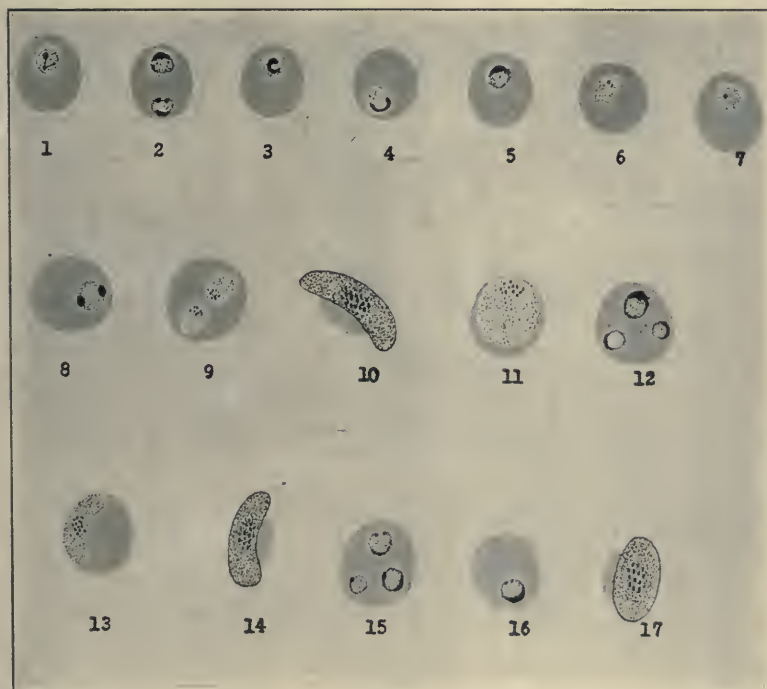
This patient, K. O., girl, aged two and one-half years, was admitted to St. Christopher's Hospital on March 13, 1907. There was nothing of moment in the family or previous medical history. The only history to be obtained was that the child awoke early in the morning complaining of abdominal pain, and vomited. During the day she vomited on four other occasions. She was sent to the hospital as a case of pneumonia, and on admission signs of marked pulmonary congestion were present—cough, rapid and harsh respiratory sounds, with some cyanosis, and rapid heart action. These signs soon disappeared. The child had a continued fever of remittent type, varying from 3° to 4° between morning and evening, with only a moderate increase in the frequency of respiration and in the pulse-rate.

On the fourth day there was a sudden fall of temperature of 6° , followed by a rise the next day. The spleen at this time was found to be enlarged and easily palpable. The temperature showed a periodic rise at noon, suggesting strongly the diagnosis of malaria. There was no discomfort associated with the rise of temperature outside of marked restlessness and peevishness, and there was no chill; nor was there any sweating, cyanosis or pallor.

The blood was first examined on the seventh day during the

* Read by invitation before the Philadelphia Pediatric Society, May 14, 1907.

rise of temperature, and showed the presence of malarial plasmodia. Small hyalin bodies were first found, (Figures 1-8), and afterward the crescent type of organism. (Figures 10, 13, 14.) Several organisms showed the signet-ring appearance. (Figures 2, 5, 12, 15, 16.) Only one ovoid body was seen. (Figure 17.)



DESCRIPTION OF PLATE.

Figs. 1-7 represent the blood picture on March 21st.

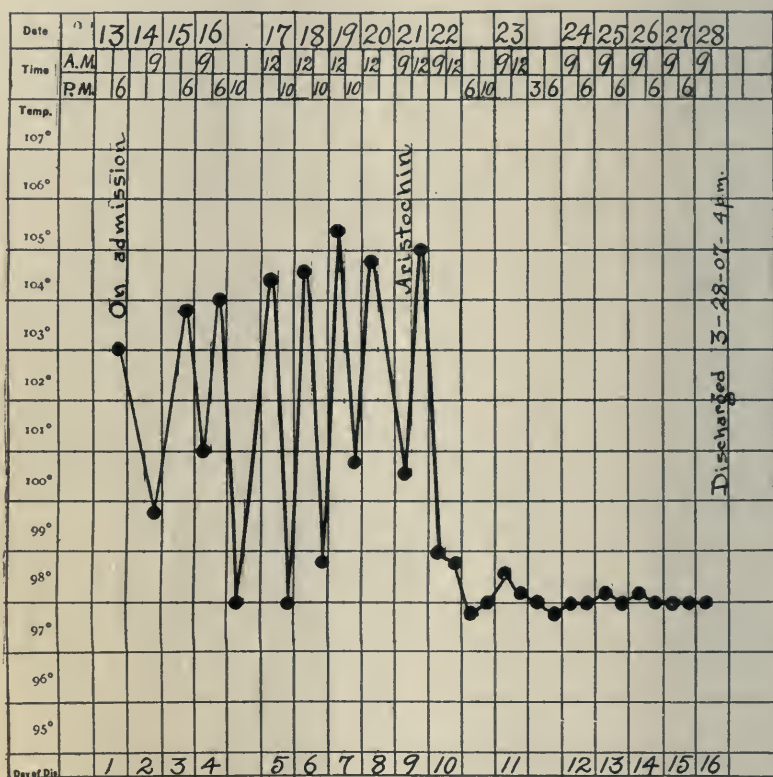
Figs. 8-12 represent the result of the examination on March 20th.

Figs. 13-17 were seen in the blood on March 21st.

Plasmodia were found in the blood successively on the seventh, eighth and ninth days. The leukocyte count on the seventh day was 5,200.

The treatment consisted of the administration of 40 grains of aristochin daily, which produced an immediate effect, the temperature rapidly becoming normal and remaining so during the remainder of the patient's stay in the hospital. At the time of discharge—one week later—there were no plasmodia in the blood.

Aristochin was administered in small doses (1 grain, thrice daily) for two weeks and then discontinued. The child became bright and happy, and has never had any relapse or recurrence of any kind. Repeated blood examinations have failed to show the presence of any plasmodia.



In view of the fact that the crescent forms were not seen in the blood after the administration of aristochin, it seems quite probable that the drug possesses a powerful destructive action upon this type of organism, which usually resists the action of quinin even in large doses, and persists for some time in the blood.

The course of the fever in this child is interesting because it suggested a double tertian infection—the temperature showing daily exacerbations. Nearly two-thirds of the cases of estivo-

autumnal fever reported by Thayer and Hewetson showed this quotidian type of paroxysm.

SUMMARY.

In considering this case, the following points seem worthy of emphasis:—

(1) The marked pulmonary symptoms which were present at the onset of disease, and which served to mask the real infection.

(2) Absence of any typical malarial symptoms, such as chills, sweats, cyanosis, pallor, cold extremities, prostration, etc.

(3) The prompt and permanent action of aristochin.

(4) The relatively infrequent occurrence of the disease, in this latitude, in so young a child, and the fact that investigation as to the source of infection revealed nothing positive.

2600 Lawrence Street.

Rectal Prolapse in Children.—Mummery remarks that rectal prolapse is a comparatively common affection among children. It is about equally common in males and females. Diarrhea seems to be the commonest antecedent. Stone in the bladder was in no case present. There was a local cause in only 7 out of 50 cases. General weakness and malnutrition appear to be the commonest factors. Absorption of fat is a result of malnutrition, and the removal of this fat from the rectum predisposes to prolapse. The exciting cause he considers to be the unnatural method of defecation adopted in civilized countries. Pathologic prolapse does not occur in animals or uncivilized races. The natural position is the squatting one, in which the glutei and perineal muscles are firmly contracted, supporting the levatores ani, tightening the pelvic fascia, and firmly fixing the coccyx. In treatment, attention must be paid to the general health and nutrition. The mother must be told that the child must not use the chamber, but pass all its stools into a shallow pan placed on the ground, the child itself being placed in a squatting position. When a local cause is present, it should be attended to; adenoids also, if present, must be treated, as they are an important cause of malnutrition.—*Journal of American Medical Association, from British Medical Journal.*

SARCOMA OF THE KIDNEY IN CHILDREN. WITH REPORT OF A CASE.*

BY WILLIAM SHANNON, M.D.,
New York.

Although sarcoma of the kidney is the commonest form of renal tumor in children, it is of sufficiently rare occurrence to warrant the publication of individual cases. The present case is of interest because of the age of the patient and of the nature of the growth.

Kidney tumors reported up to 1884 appeared under various titles, such as cancer, malignant tumors, etc., no distinction having been made between carcinoma and sarcoma. Catanni, in 1870, was the first to recognize sarcoma of the kidney. In 1884 Dr. A. Jacobi proved that most of the reported cases were of sarcoma by a critical review of the findings. Their mixed nature was recognized by Eberth and their embryological character by Cohnheim.

These tumors take their origin in failures of development, consisting of a proliferation of the elements of embryonal tissue. There is an increase of the glandular elements and a sarcomatous proliferation of the connective tissue. The relative quantities of these tissues may vary not only in different tumors, but in different parts of the same tumor. Sections taken from an individual growth may show adenoma, carcinoma, sarcoma or a transition from one to the other. These tumors do not show so strong a tendency to infiltrate surrounding healthy tissue as do carcinomata. They grow to an enormous size, and, although they may remain quiescent for a time, their growth sometimes is very rapid.

Charles S., aged three and one-half months. Family history negative. Breast fed. At the age of three months the abdomen was noticed to be enlarged on the left side. There being no other indications of illness, medical advice was not sought until ten days later, when the abdomen had become enormously distended and the bowels had not acted for two days.

When first seen at this time, the child was fairly well nour-

* Read at Section on Pediatrics of the New York Academy of Medicine, April 11, 1907.

ished, but very pale, with an anxious expression and great restlessness, due apparently more to diaphragmatic pressure than to pain. There was marked dyspnea. Heart and lungs were normal. The abdomen was distended, the left contour slightly irregular and more prominent than the right. The subcutaneous blood vessels were dilated. On palpation a large semi-solid mass occupying the whole left side and extending well beyond the median line was revealed. It was uniformly smooth and rounded except to the left and a little above the umbilicus, where a hard, flat, oblong mass was outlined, about three inches long and two inches wide. The large mass rounded off above, indicating that it was not continuous with either the spleen or the liver. On percussion, tympany was elicited on the left side above the mass, extending into the epigastric region; flatness was obtained over the oblong body; dullness over other portions of the mass and some tympany on the right side. There was no evidence of pain on percussion or palpation.

The diagnosis of sarcoma of the left kidney was made and operation was advised and was performed by Dr. George Woolsey. Incision of the abdominal wall revealed a large cystic tumor, which was tapped in several places and removed.

The child failed after the operation and died eight hours afterward. As a quantity of fluid escaped from the tapping and handling, the exact weight could not be determined, but it weighed approximately $3\frac{1}{4}$ pounds and was about eight inches in diameter.

The following is the pathological report made by Dr. James Ewing:—

REPORT ON CASE OF CONGENITAL SARCOMA OF KIDNEY.

The specimen consists of a multilocular cystic tumor of spherical form, 15 cm. in diameter and weighing 690 grams. The mass is surrounded by a fragile capsule, with general adhesions which have been torn in removal.

A definite portion of the kidney persists along one segment of the tumor, and here the tumor is seen to be intimately connected with the kidney. The tumor grows outside the pelvis of the kidney. The pelvis is reduced to a series of flattened channels, lined by unaltered epithelium, into which the papillæ enter. This relation is consistent with Brozin's view of the origin of the tumor. The walls of the cysts are composed of soft, translucent,

mucinous, connective tissue. The content of the cysts is a slightly turbid fluid containing some mucus. It was not further examined.

Microscopical Examination.—The tumor springs directly from the kidney structure, being separated therefrom by a zone



PREPARATION OF SARCOMATOUS KIDNEY,
Showing the remnant of the kidney tissue along the extreme right
border, the cystic character of the growth and the flattening
of the pelvis of the kidney

of loose connective tissue infiltrated with round cells and showing on one side atrophying renal tubules, and, on the other, alveolar structures of the tumor. The section consists of anastomosing bands of sarcomatous tissue enclosing cysts, the bands varying in width from thin strands to 1 cm., and the cysts from small alveoli to cavities 3 cm. in diameter. The bands consist principally of

loose cellular tissue composed of large fibroblasts with mucinous intercellular substance. They contain, also, epithelial structures lying in nests of sarcomatous cells. No muscle cells or fat or cartilage were found. The cysts are lined by one or two layers of low cuboidal epithelium, sometimes showing papillary projections, but in others flattened. There seems to be every gradation between the large cysts and the small alveoli of the tumor, and the conclusion may be drawn that the cysts arose by distention of these alveoli.

The epithelial structures in the trabecula appear under different forms: (1) Single alveoli lined by low columnar or cuboidal epithelium. These resemble renal tubules. (2) Large alveoli of similar structure in which there are papillary tufts composed mostly of epithelial cells, and strongly resembling renal glomeruli. (3) Tubules lined by many rows of cells or foci in which the lumen of a tubule is obliterated by a diffuse growth of epithelial cells. There is, therefore, a carcinomatous element in the tumor.

The sarcomatous elements constitute the bulk of the cyst walls, and are usually loose and edematous. In many foci, however, there are groups of very numerous, closely packed, large spindle-shaped cells. These usually surround epithelial alveoli.

The tumor belongs in the group of adenosarcoma of the kidney, described in 1894 by Birsch-Hirschfeld, and by many earlier and later writers. Various names have been applied to it, such as Congenital Sarcoma, Embryonal Adenosarcoma, Embryoma (Wilms), Malignant Nephroma (Nephroma embryonale malignum) (Trappe), Myxosarcoma Strio-cellulare (Ribbert). The present specimen deserves the histological designation, Malignant embryonal adeno-carcino-sarcoma.

These tumors, whose structure varies considerably, have been supposed to be derived from the primitive kidney, from the Wolfian body, and from the true kidney itself. Ribbert supposes that the muscle tissue commonly present requires also the inclusion of a mesodermal element in the originating tissue.

Brozin regarded the tumor as springing from the renal lymph vessels of the hilus, and the alveolar structures as composed of endothelium. Ribbert described a case of somewhat doubtful position, which he regarded as a papillary tumor arising from the renal pelvis. The gross appearance of the present specimen suggests such a relation, but the microscopical structure eliminates it.

The present case resembles the majority by giving evidence of origin from the true embryonal tubules and glomeruli. Wilms has given the most elaborate study of the embryological relations of the tumor.

Medical treatment of these cases is of no avail. The only hope lies in surgical procedures, and, though the mortality is high, operation is justifiable, for by it life has been prolonged in some cases for years.

Statistics show an immediate mortality of 38.25 per cent.; an ultimate mortality of 84.42 per cent., and of cures, 5.47 per cent.

This mortality would probably be much lower if operation were done earlier, for it is in the early cases that operations are most successful.

130 West Eighty-first Street.

Impure Heart Sounds in Children.—Neumann reports several typical cases in which the children were apparently healthy, with nothing to call attention to the heart except the discovery of a lack of purity in the heart sounds. He noticed this in his private practice in 71 children under five years; in 89 between six and ten, and in 20 older children. This change in the character of the heart sounds came on suddenly, and he is inclined to think that it is permanent. Preceding catarrhal affections of the upper air passages is almost invariably mentioned in the history, and he thinks that involvement of the heart in infections of the upper air passages, especially of the nose, is so common that the heart should be supervised in all such cases. Children with this anomaly in the heart sounds evidently have something more or less wrong with the heart. Although slight cyanosis and shortness of breath are sometimes observed, as a rule there are no signs indicating disturbance beyond the one mentioned, and the children take cold baths and exercise violently—against the physician's advice—with apparent immunity. It is evident, however, he thinks, that the heart is not intact, and that the life expectancy is more or less modified by it.—*Journal of the American Medical Association.*

REMARKS ON THE EXUDATIVE DIATHESIS OF CZERNY.*

BY A. HYMANSON, M.D.,

Adjunct-Attending Physician (Children's Service) Beth Israel Hospital,
New York.

Since the earliest days of medicine vague ideas and conflicting views have been held on the subject of scrofula.

Of late, careful investigators have proven microscopically and by inoculation that the majority of cases of scrofulosis were of a tuberculous nature. Professor A. Czerny,¹ of Breslau, has discarded the term scrofulosis, which has gradually fallen into disuse, and has described some phases of the disease, which are common among children, under the new expression, "exudative diathesis."

This diathesis rests upon a congenital anomaly of the organism and affects almost all children of the same family in different degrees. In most cases, heredity plays an important rôle. The parents may not recall, or may be ignorant of, the fact that they themselves have had evidences of this constitutional disorder during infancy or childhood.

Quite often the disease manifests itself during the first year of life, even in the first few weeks of infancy. Some children look weak, others well-developed and strong, but upon close observation one will recognize this affection. The parents may be large and strong, still the children are often weak and flabby.

Some diarrhea may be present even in breast-fed babies, or there may be no gastrointestinal disturbances, yet the children do not thrive. Then, again, although the breast-milk may not be of the best quality, still some children continue gaining in weight, there being an excess of fat, while the muscular tissues are poorly developed, the upper part of the body being more flabby than the lower. There seems to be some trouble in the metabolism, and the child does not use up the fat properly. The stout children are in more danger than the thin ones.

The first symptom observed is the geographic tongue, or localized thickening of the lingual mucous membrane, the cause

* Read before the Section on Pediatrics, New York Academy of Medicine, April 11, 1907.

of which is unknown. It is a manifestation seen only *in vivo*. At the postmortem nothing of this is seen macro- or microscopically. These raised patches change their position, and may remain for months or years.

Another manifestation is seborrhea of the scalp, which appears during the first few weeks of life or later. It consists of dark-grayish or brown scab, which, if irritated, may become wet and eczema may ensue.

Strophulus is also common in these infants. The skin becomes reddish around the cheek and ear, also whitish scales are formed. They remain for several days, disappearing and reappearing.

Another symptom is prurigo. It may begin very early in life and may last for months or years. In stout children it sometimes lasts up to the sixth or eighth year. The essential features of the eruption are the hard, isolated, non-inflammatory reddish papules, seated on a harsh, dry skin, mainly on the anterior and external parts of the extremities and also on the body. This may disappear without any trouble, but as the infant suffers from an intense itching, which causes it to scratch itself, the aspect of the affected region is modified. The skin becomes thickened with solid papules and covered more or less with pustules and crusts.

Intertrigo or hyperemia of the skin, behind the ears, axillæ and groin, is quite common. The apparently cured skin gives rise to the manifestations again.

In nervous children the itching of the skin affections is usually of a severe type, and the scratching of the body with the nails or rubbing the face against the bed-clothes is prone to cause eczema and infection of the neighboring glands. As the skin of an infant is extremely delicate, it is easily affected by microorganisms, and this may be the portal of entry of tubercle bacilli. This explains the enlarged glands of the antiquated term "scrofula."

In older children, just as the cutaneous tissues are being affected in this way, the mucous membrane of the nose, throat and lungs is subject to various diseases. Coryza, adenoids, hypertrophied tonsils, pharyngitis, postpharyngeal abscess, false croup, bronchitis, bronchial asthma, conjunctivitis, otorrhea and catarrhal vulvitis are quite common.

Even though the tonsils and adenoids are removed, the children still get their periodical sore throat, because the mucous membrane of the throat becomes inflamed just the same. The trouble cannot be attributed to a mere exposure, but must be due to some constitutional dyscrasia. These children suffer from periodic attacks of anorexia, coated tongue and fetid breath, constipation and a slight rise of temperature for several days or weeks. Anemia is quite common in these cases.

These children are treated with various medications, but without avail. It must not be forgotten that in the majority of cases the trouble begins in the nose and throat, also there is an absorption of toxic substances which enter the body through these channels. Infections weaken the system and predispose the child to various diseases. There is no doubt that every one of us comes across this class of cases, which has absolutely nothing to do with tuberculosis, though tuberculosis may be secondary to the exudative diathesis.

According to Czerny, it is necessary to keep three things in mind when treating these cases:—

- (1) Careful feeding.
- (2) The condition of the nervous system.
- (3) Avoidance of intercurrent infection.

The most important thing in these cases is to study each case thoroughly. A complete history must be taken and inquiries must be made as to the hygienic surroundings and the kind of food the children get. Gaining in weight is not the only salvation in this disease; the muscular development and the general aspect of the child must be looked to. As was mentioned before, the child may gain in weight and yet remain flabby, with soft tissues and but little resistance. Any nourishment which fattens the child is injurious to its health. Over-feeding has the same effect, but the reverse is helpful. One must not expect good results immediately after changing the diet. To get them it takes weeks and often months.

For children with the exudative diathesis, after the second year of life, a vegetable diet is best. Should it fail to agree with the child, small quantities of soup and some milk may be given. Eggs are the most unsuitable food for this class of children; a small quantity of meat has not so bad an effect. The child should be given plenty of water to drink, no cream, very little milk ($\frac{1}{4}$

to $\frac{1}{2}$ liter per day), no butter and no sweets. Fresh fruit may be given.

The feeding in the first two years of life is very difficult,² since milk is the chief article of diet. The physician should try to sustain the child on little food, and care must be taken that it does not gain too much fat.

If a stout, breast-fed baby shows symptoms of the exudative diathesis, reduce both the number of feedings and the time allowed for nursing, giving only four feedings a day. If the child is gaining weight on four feedings and presents severe symptoms of the disease, give it, instead, three breast feedings and an additional meal of gruel and soup, even at the fourth or fifth month. The very thin children should have one or two more meals of gruel, malted milk or malzsuppe, which will often show excellent results.

Some of these children do not thrive on mother's milk, not because the milk is faulty, but from the fact that the children are prone to suffer from inflammatory conditions of the mucous membrane, such as coryza, tonsillitis, bronchitis, etc. These affections cause anorexia, and the toxins they produce through infection interfere with the metabolism, hence the diminution in weight.

Caution should be taken when weaning the baby. If it gains in weight somewhat, there is no reason for weaning it. If a child having this disease be weaned, special care must be taken not to overfeed it, as these patients are apt to have various complications, such as gastrointestinal disorders, convulsions and tetany. Weaning is sometimes very beneficial, curing their skin affections.

Professor Czerny assures us that these children, when kept on this regimen, and on being removed to a suitable locality, make wonderful progress, and that all the forms of skin diseases before mentioned are practically cut short and seldom reappear. Throat and bronchial troubles very seldom occur and the susceptibility to infectious diseases is generally diminished. Of course, one must take care not to expose these children to any infectious diseases. If any member of the family has a cold, the child should not come in contact with that person.

With older children particularly, one must be careful not to speak of their ailments in their presence. It is very important

that these children associate with others of their own age, and are not too much in the company of adults. They should go to school and not be taught at home, as they will consider themselves invalids.

For the last sixteen months I have closely followed the treatment mentioned by Professor Czerny and found it beneficial. I shall speak of one family in particular, where the children were always suffering from eczema, intertrigo, tonsillitis and various catarrhs. I advised the parents to move to the country and to give the children a vegetable diet, which was done.

During the six months they lived in the country, the mother, who is quite an intelligent woman, carried out my instructions precisely, and had no trouble with the children at all. Just as soon as the family returned to New York the children suffered from tonsillitis and various catarrhs, but the skin diseases were absent.

I shall cite another case which illustrates the value of diminishing the number of feedings:—

Charles F., four and one-half months old, who had been well and strong at birth, was nursed. When four weeks old he was suffering from seborrhea capitis, and, when eight weeks, from intertrigo. He had been suffering for two weeks from gastrointestinal disturbances.

The mother's milk was analyzed and found perfect in every regard. In spite of his troubles the child weighed 16½ pounds, but his muscles were flabby. On closely questioning the child's grandmother I discovered that the child's mother also had scrofulosis during childhood.

I advised the mother to diminish the number of breast feedings to four and then to three per day, and give one additional meal of strained barley gruel. The child cried the first two days, but became accustomed to the diet later on. I advised plain water, which aided in pacifying him. Within one week the gastrointestinal troubles disappeared, and the skin affections improved shortly. At first he lost weight, but later on he kept up nicely. He received practically no medication.

REFERENCES.

1. Jahrbuch für Kinderheilkunde, Vol. LXI., No. I.
2. Monatsschrift für Kinderheilkunde, Bd. IV., No. I.

THE REPORT OF A CASE OF RETROPHARYNGEAL ABSCESS IN A GIRL ELEVEN YEARS OLD.*

BY HERBERT E. CARPENTER, M.D.,

Physician to the Medical Dispensary of the Children's Hospital,
Philadelphia.

As acute retropharyngeal abscess in children over three years is uncommon, I thought the following case of interest:—

Margaret W., aged eleven years. Her family history was negative. She was fed at the breast for six months, and afterward on modified milk. She had measles at four years, and whooping-cough at eight; otherwise was healthy, except for a tendency to catarrhal "colds."

During the first two weeks of March, 1906, the patient's entire household suffered from an epidemic of influenza. She was taken ill on the 6th of March, with high fever, sore throat, enlargement of the lymphatic glands of the neck, torticollis and general muscular pains. On the following day her tonsils were very much swollen, nearly closing the pharynx; the follicles were filled, and what little of the posterior wall of the pharynx could be seen exhibited a severe follicular inflammation. Within three days the inflammation and soreness began to subside, and at the end of a week the child seemed to have recovered except for torticollis and snoring at night. Inspection at this time showed a marked swelling of the posterior wall of the pharynx, a little to the right of the median line. On palpation, fluctuation was obtained. The posterior wall of the pharynx was pushed forward, and the abscess was just beneath the surface of the mucous membrane. She was seated in a chair facing a good light; the tongue was depressed; and, after cocainizing the parts, a bistoury, with its edge guarded by adhesive plaster (leaving about half an inch of the tip exposed), was introduced into the most prominent part of the tumor, and the incision enlarged from above downward. The head was thrown forward to allow the abscess to drain into a basin, and the cavity was washed out with Dobell's solution. The pain and rigidity of the muscles of the neck improved almost at once. The abscess healed within forty-eight hours. This abscess was probably due either to a streptococcus infection or to the influenza bacillus causing inflammation and suppuration of a retro-

* Read at the meeting of the Philadelphia Pediatric Society, May 14, 1907.

pharyngeal node. These nodes are most prominent in infancy, and diminish rapidly in size after the third year.

Retropharyngeal abscess is a disease of early life; more than 80 per cent. of the cases occurring before the second year. Lennox Brown says it is a rare affection. He noted but 6 cases in a service of over twenty years. This seems to have been the general experience of nose and throat specialists, whereas the pediatricians seem to have observed many more cases. Holt and Rotch say it is almost always seen in infancy, and that it is rare after the first year. Bokai reported 60 cases; 42 occurring during the first year, 11 during the second year, and only 7 at a later period.

Koplik says the disease is rare after the fifth year. Of his 70 cases, 4 occurred before the third month; 10 before the sixth month; 41 between the sixth and twelfth months; 19 between the first and fifth years; and only 3 after the fifth year.

The second case is a typical one, and is reported, as it affords a contrast to the first. It occurred in a seven-months-old breast-fed baby. The mother said it had always been a very healthy infant. It had a "cold" in the head, with some fever, for several days; and for three days had been very fretful and restless. The mother noticed that the child's breathing was somewhat labored during sleep, and that it did not nurse well. The difficulty in breathing and nursing was increasing, and when I saw the baby it had dyspnea, which seemed to be mostly inspiratory, and was worse in the recumbent position. It would nurse for only a few seconds at a time, and was growing weak evidently from lack of nourishment and from the labored breathing. The cry had a nasal twang. The head was thrown back and the mouth was open. The breathing was rattling and snoring, at times stertorous. Inspection of the throat, owing to the diminutive size, was difficult, and rendered more so by the accumulation of mucus. On introducing the finger a tense fluctuating swelling was detected in the posterior wall of the pharynx, nearly in the median line, reaching down to the larynx.

Using a finger as a guide, an opening in the abscess was made, and a large amount of creamy pus was evacuated. Pressure with the finger on the walls of the abscess was necessary to thoroughly empty it. The infant began to breathe easily at once, and made a perfect recovery in a few days. There has been no return of the disease.

ARCHIVES OF PEDIATRICS.

DECEMBER, 1907.

LINNÆUS EDFORD LA FÉTRA, A.B., M.D.,

EDITOR.

ROYAL STORRS HAYNES, Ph.B., M.D.,

ASSOCIATE EDITOR.

COLLABORATORS:

A. JACOBI, M.D.,	New York	T. M. ROTCH, M.D.,	Boston
V. P. GIBNEY, M.D.,	"	F. GORDON MORRILL, M.D.,	"
L. EMMETT HOLT, M.D.,	"	W. D. BOOKER, M.D.,	Baltimore
JOSEPH E. WINTERS, M.D.,	"	S. S. ADAMS, M.D.,	Washington
W. P. NORTHRUP, M.D.,	"	GEO. N. ACKER, M.D.,	"
FLOYD M. CRANDALL, M.D.,	"	IRVING M. SNOW, M.D.,	Buffalo
AUGUSTUS CAILLÉ, M.D.,	"	SAMUEL W. KELLEY, M.D.,	Cleveland
HENRY D. CHAPIN, M.D.,	"	A. VANDER VEER, M.D.,	Albany
A. SEIBERT, M.D.,	"	J. PARK WEST, M.D.,	Bellaire
FRANCIS HUBER, M.D.,	"	FRANK P. NORBURY, M.D.,	St. Louis
HENRY KOPLIK, M.D.,	"	W. A. EDWARDS, M.D.,	Los Angeles
ROWLAND G. FREEMAN, M.D.,	"	WM. OSLER, M.D.,	Oxford
DAVID BOVAIRD, JR., M.D.,	"	JAMES F. GOODHART, M.D.,	London
WALTER LESTER CARR, M.D.,	"	EUSTACE SMITH, M.D.,	"
LOUIS STARR, M.D.,	Philadelphia	J. W. BALLANTYNE, M.D.,	Edinburgh
EDWARD P. DAVIS, M.D.,	"	JAMES CARMICHAEL, M.D.,	"
EDWIN E. GRAHAM, M.D.,	"	JOHN THOMSON, M.D.,	"
J. P. CROZER GRIFFITH, M.D.,	"	HENRY ASHBY, M.D.,	Manchester
A. C. COTTON, M.D.,	Chicago	G. A. WRIGHT, M.D.,	"
F. FORCHHEIMER, M.D.,	Cincinnati	A. D. BLACKADER, M.D.,	Montreal
B. K. RACHFORD, M.D.,	"	JOAQUIN L. DUEÑAS, M.D.,	Havana
C. G. JENNINGS, M.D.,	Detroit		

PUBLISHED MONTHLY BY E. B. TREAT & CO., 241-243 WEST 23D STREET, NEW YORK.

President and Treasurer, E. B. Treat; Secretary, E. C. Treat.

Contributors and Correspondents, see page III.

THE INTERNATIONAL CONGRESS ON TUBERCULOSIS.

The next meeting of the Congress will be held in Washington from September 21st to October 12th, 1908. The second week is reserved for the reading of papers and for discussions. The first and third weeks are given up to exhibitions and special lectures. The Congress will be divided into seven sections. The fourth, that on "Tuberculosis in Children—Etiology, Prevention and Treatment," will be under the direction of Dr. A. Jacobi, No. 19

East Forty-seventh Street, New York, President; Dr. David Bovaird, Jr., 126 West Fifty-eighth Street, New York, and Dr. Frank S. Churchill, 439 N. State Street, Chicago, Secretaries.

It is earnestly requested that those physicians who can add to the knowledge of the subject will join in the work of the Section by reading papers or taking part in the discussions. Those who desire to participate in the meetings of the Section are requested to communicate with the President or one of the Secretaries at an early date and also to send an abstract of their proposed communication on or before July 15, 1908. As suggestions for themes of study the subjoined list of subjects has been prepared:—

LITERATURE.—Before 1882. After 1882.

TUBERCULOSIS.—Acute. Chronic. Dormant. Latent.

HEREDITY.—Sperm. Ovum. Placenta. Fetus. Congenital. Heredity of "disposition."

ANATOMY.—Condition of mucous membranes in the newly born, and of its epithelium. Heart and arteries. Size of lungs. Upper thorax aperture. Habitus phthisicus. Size of nares. Lymph apparatus of nares, nasopharynx, pharynx.

RELATION TO OTHER ORGANS.—Is there a general inferiority in tuberculosis (morphological or functional)?

GENERAL OR LOCAL OVERGROWTH CONNECTED WITH TUBERCULOSIS.—Condition of skin. Connection with nævi. Abnormal nipple, as sometimes in the adult. Connection with diabetes in infancy and childhood.

BODY WEIGHT.

LOCALIZATION.

Lungs.—Differences according to ages. Puberty. Hemoptysis. How frequent are cavities? Pneumothorax. Diagnosis by sputum. From peribronchitis, chronic catarrh, chronic pneumonia. By tuberculin. By agglutination. Relative frequency, by bovine infection, of lung disease compared with that of other organs. How frequent is expectoration? Influence of schools. Are children or teachers more dangerous?

Serous Membranes.—Pleura. Peritoneum. Pericardium. Dura mater.

Bones.—Growth increased? Mastoid. Other localizations.

Different Forms of Meningitis, According to Ages.—Ependyma. Cerebrospinal fluid. Choroid. Heart. Blood vessels.

Digestive Organs.—Mouth and throat. Intestinal mucous membrane. Its perviousness. Spleen. Liver. Kidney. Ureter. Bladder. Testes. Ovary. Uterus. Mamma. Ovum. Rectum.

INVASION.

Inhalation.—Waldeyer ring. Adenoids. Tonsils. Mouth. Intestine. Skin. Smallest vessels first seats of deposit. Adenitis. Cervical, tracheobronchial, mesenteric. Relation to "colds"; to scrofula.

CAUSES.

Social Elements.—Modern industry. Trade. Endemic influence.

Trauma.

Atavism.

Parentage.—Syphilitic. Alcoholic.

Influence of the Poor on the General Population.

Bovine Bacillus More Dangerous to the Young?

Infectious Diseases.—Measles. Whooping-cough. Influenza.

Constitutional Ailments.—Rachitis. Catarrh.

Meat?

Uniformity of "Percentage" Feeding.—Fat Feeding.

Milk, According to Koch and Behring.

Formalin and Other Poisonous Preservatives.

TREATMENT.

Prophylaxis.—Spontaneous recovery. Diminution of infant mortality. Infant feeding. Fat feeding. Formalin. Beef. Pasteurization or sterilization; compulsory, and how long? Contraindication to breast feeding.

Hygiene.—Of mouth. Nares. Pharynx. Intestine. Skin. Mucous membrane in general. Lymph bodies. Lungs. Prevention of "colds."

Bathing.—Temperature of water. Temperature of air.

Clothing. Question of "night air." Climate. Altitude.
Home Air-treatment. Gymnastics.

SANATORIA.—Western Hemisphere. Eastern Hemisphere.
Watching and shortening symptoms of whooping-cough,
measles, influenza.

HOSPITAL TREATMENT OF TUBERCULOSIS.

SCHOOLING.—Age and methods of immunization.

DRUGS.—Guaiacol. Creosote. Arsenic. Cod liver oil. Phosphorus. Hypophosphites. Cardiac stimulants. Sera.
Orthopedic and operative treatment p. r. n. Treatment of
"Scrofula" of skin and mucous membranes.

BIER TREATMENT.

Juvenile Physiological Albuminuria.—Ullmann (*Berlin. Klin. Woch.*, February 4, 1907) examined the urine of 42 small children and school girls between the ages of two and a half and thirteen years. These children were supposed to be perfectly healthy, and for the most part were well nourished, and all were subjectively well. Fourteen, or 33.3 per cent., however, had albumin in their urine without any other evidences of nephritis, and on the basis of this experience Ullmann suggests that this condition must be considered as a more or less physiological manifestation of early life. In most instances the tendency is outgrown, but when it is found in adults it must be regarded as the persistence of this early condition. He therefore does not agree with Leube in regarding the albuminuria of puberty of this author as a disease of development with a well characterized clinical picture, and also does not consider that it should be called orthotic albuminuria, but rather that the condition should receive the name of juvenile physiological albuminuria, and be differentiated as such. This diagnosis naturally can be made only after long-continued and careful observation. Treatment is superfluous, for in most cases the tendency disappears as the individual grows up, and in the others it persists in spite of all therapeutic efforts. It is without effect on the patient's health or length of life, and its presence need not be apprehended by insurance examiners.—*Medical Record*.

Society Reports.

THE NEW YORK ACADEMY OF MEDICINE—SECTION ON PEDIATRICS.

Stated Meeting, April 11, 1907.

GODFREY R. PISEK, M.D., CHAIRMAN.

A CASE OF LATE HEREDITARY SYPHILIS.

DR. JOHN HOWLAND presented a boy, twelve years old, the second of three children, the other two being well. The mother and father denied any syphilitic infection. The boy was very sickly as a young child, but had never had any of the lesions of hereditary syphilis. He had not walked until he was three years old, but both of the other children had walked late.

In December, 1906, he began to complain of difficulty in walking and of some stiffness and pain in his knees. He was treated at home until April for rheumatism. No other joints were affected.

Three weeks ago he was under treatment for a typical interstitial keratitis, which could be due only to syphilis or tuberculosis. He had a fever of 101.5° F. and was in much worse condition than now. The knee joints were more painful and stiff, and contained more fluid. He had undoubtedly syphilitic disease of the knee joints with affection of the synovial membranes and of the head of the tibia. There were points of tenderness over the heads of the fibula.

Fournier speaks of joint lesions in hereditary syphilis early or late, and says that they occur in 39 per cent. of all such cases. Dr. Howland thought it was well to recognize the fact that many joints in which one fails to make out any evidence of syphilis may possibly be instances of hereditary syphilis, and they should be treated as such.

The case presented had improved markedly under anti-syphilitic treatment, which consisted of mercury inunctions.

DR. CHARLES HERRMAN asked if it would not be possible to aspirate some of the fluid to see if there were any spirochetæ there.

DR. JOHN HOWLAND replied that it would be possible, but he doubted whether any would be found.

DR. LOUIS FISCHER thought that the boy had fever. He would have been tempted to aspirate, thinking of suppuration in the joints. He had a duplicate of this case. The child was under treatment for about eight or nine years and nothing was done with the joints excepting occasional aspiration. The child had otitis; the eyes, the cervical lymph nodes and the knees and ankle joints were involved. He thought that some benefit was derived from aspirating the joints, although the joints refilled.

DR. HOWLAND said that the boy had been under treatment only ten days and had improved greatly. He thought it best to leave the joints alone, at present anyway, while there was so much improvement.

DR. GODFREY R. PISEK called attention to the fact that there was a bilateral involvement in this case.

DR. HERMAN SCHWARZ believed that an X-ray picture would have aided in making the diagnosis, as in these congenital cases it would show enlargement, or thickening, of the periosteum.

He did not think it was fair to aspirate the joint simply for diagnostic purposes unless one was prepared to operate at once.

A CASE OF DIABETES INSIPIDUS.

DR. ELI LONG presented this patient, whom he had shown at a previous meeting of the Section, in order to demonstrate his present condition. The child's polyuria had persisted practically uninfluenced by treatment.

DR. LOUIS C. AGER said that he had under his care with the same condition a boy four and a half years old, who weighed $34\frac{3}{4}$ pounds, and passed at present 10 to 14 pints of urine, with a record of 19 pints on some days. The urine had a specific gravity of from 1.0005 to 1.002, and contained no sugar. The boy's general condition was pretty good except for the enormous amount of urine he passed. Some years ago he had symptoms of a tuberculous meningitis, and it was possible that there was a slight basilar meningitis in this case.

Dr. Ager called attention to the elaborate researches of Schæfer and Herring on the effect of injections of extract of the pituitary gland. These investigations have proved pretty con-

clusively that the internal secretion of the posterior lobe of the pituitary gland has a powerful and long-continued stimulating action on the kidneys. It is therefore reasonable to suppose that diabetes insipidus is due to a chronic irritation of the pituitary body.

UNEXPLAINED HIGH TEMPERATURE IN A CHILD.

DR. LOUIS C. AGER reported a case of a child of twenty-one months who had for three days an evening temperature of over 106° F., with morning remissions. When first seen the patient had slight fever, moderate abdominal distention, rapid respiration, with red throat and clear lungs. Later, a tentative diagnosis of pneumonia was made because of the fever, rapid respiration and movement of the alæ nasi. After the third rise in temperature, Dr. Ager was tempted to administer quinin hypodermatically, but the possibility of mosquito activity in the then cold weather was so improbable that he decided to wait for the report from the smears taken at the onset of the illness. On the following day the temperature became normal and remained so. The urine showed nothing abnormal. Widal reaction was negative and no malarial plasmodia were found.

It was fortunate that quinin was not administered, for had it been given, the fall of temperature would have been attributed to it, the microscopical findings would have been discredited, and the child would have been subjected to a course of quinin which might have proved actually harmful.

DR. CHARLES HERRMAN said that the reddened throat and the irritability of the patient and the other symptoms pointed to a diagnosis of gripe. Some years ago Dr. La Fétra had presented a temperature chart similar to this.

DR. LOUIS FISCHER said that several months ago at the Willard Parker Hospital he had seen a child who suddenly developed a high temperature which persisted in spite of calomel. When milk was stopped for a day or two the temperature dropped. The drop in temperature in the case reported, followed by the rapid rise, looked to him like a case of autointoxication, due to stagnant milk curds, and if he had seen the case for the first time with the history presented, he would have made that diagnosis.

DR. THERON W. KILMER believed the case to be one of status lymphaticus. He recalled such a case, an infant of six or seven

months, apparently healthy, yet having, two or three times a day, a temperature of 105° or 106° F. with convulsions.

DR. E. H. BARTLEY thought there was a possibility of the case being one of infection with the colon bacillus, because when the temperature fell it went below normal, as is common in this infection and not in grippe.

DR. AGER said that one never saw such a high temperature as shown in this case without a drop to subnormal. He had made the diagnosis of intestinal grippe infection, which he thought would explain the excursions in temperature. In reply to Dr. Pisek, who inclined to Dr. Fischer's diagnosis of milk infection, and asked about the previous and subsequent illnesses of the child, Dr. Ager said that the child had had no serious illness and that he came of strong, though somewhat neurotic, stock.

SARCOMA OF THE KIDNEY IN CHILDREN, WITH REPORT OF A CASE.

DR. WILLIAM SHANNON read this paper and presented a specimen. (See page 922.)

DR. LOUIS FISCHER said that percussion of the colon in cases of sarcoma of the kidney will invariably show the colon to be anterior to the kidneys. This was the only point upon which the diagnosis rested. He asked Dr. Shannon if there was any edema of the lower extremities, or of the testicles, or scrotum, or if the superficial veins were enlarged; and, if there was constipation, whether it was due to the tumor.

DR. SHANNON replied that the superficial veins were enlarged and that the constipation was caused by the pressure of the tumor.

THE EXUDATIVE DIATHESIS OF CZERNY.

DR. HYMANSON presented this paper. (See page 927.)

DR. CHARLES HERRMAN said that for the past two years, since the publication of Czerny's article, he had been studying cases presenting this diathesis, particularly babies overfed and overweight, who were affected with marked facial eczema. These cases are quite typical and can be easily diagnosed. Sometimes these manifestations on the skin are associated with neuropathic conditions, laryngeal spasm, tetany and convulsions. Belonging to this group are the cases of eczema with sudden death. It has been said that cases of eczema are improved when the children

are attacked by some acute infectious disease, during the course of which the amount of food taken is much reduced. This should give a hint as to the methods of treatment. These cases improve rapidly if the number of feedings or the quantity of food be diminished. Fat percentages should be lowered and cereals added. Bicarbonate of soda, 5-10 grains, three times a day, is of value.

DR. LOUIS FISCHER presented a photograph showing a typical geographical tongue. The patient here had a marked fetor of the breath which was due to a large amount of epithelial desquamation and cheesy fermentation in the lacunæ of the tonsils and in the region of Wäldeyer's ring. In regard to Dr. Hymanson's paper, Dr. Fischer wished to emphasize that it is a bad plan to believe that because a baby gains in weight and is fat it is perfectly healthy and its metabolism normal. He thought too much value given to the scales, and that increased weight should not be made so prominent in pediatrics without a proper study of other favorable factors. Though diet is the most important part of the treatment, hygienic treatment is of equal importance. Exudative diatheses occur in that class of people who live with closed windows, eat at irregular intervals, and whose babies hold the nipple in their mouths all night and breathe vitiated air. Many of these cases improve when sent to the country. Dr. Fischer reported the case of a child who improved in the country and relapsed when brought back to its former unhygienic surroundings.

DR. T. S. SOUTHWORTH said that it seemed to him that there was the same difficulty with this new grouping that there was with the old disease scrofulosis, namely, there was too much of an omnibus classification, including too many symptoms. He believed that as time went on, while some of the cases might be due to a diathesis, the remainder would be found to be the result of bad hygiene and bad nutrition.

VARIATION IN THE FAT CONTENT OF COW'S MILK.

DR. E. H. BARTLEY read this paper, for which see page 908.

DR. HENRY D. CHAPIN said that he had not found such wide variations in the fat content of the milk used at the Post-Graduate Hospital, where he had had assays made for over two years. There the variation was not over one-half of 1 per cent. on an

average; and it did not seem to him that milk from a good source would vary very much, although it might change some from day to day, just as mother's milk will. It is important to see that the ratio of fat to proteid is preserved. For young babies it should be 3—1 and for older children, 2—1. He took issue with Dr. Bartley in the statement that high fats mean high proteids. Milk with a 3 per cent. fat has not a 3 per cent. proteid. Even with the variations that Dr. Bartley had shown, the diluent used in modifying lessens the fat error. Dr. Chapin prefers to use three layers from the top of the quart bottle of milk—the top 9 ounces, the top 16 ounces and the top 20 ounces. These have, respectively, ratios of 3—1, 2—1, and $1\frac{1}{2}$ —1, and these are preserved in modifying, although one may get more fat at one time and less at another. Dr. Chapin does not believe in bottling the milk at the farm, thinking that the creamery has the better facilities. Separating the milk and the cream and recombining them tends to interfere with the natural emulsion of the milk. He did not think that the paper had shown any very great inaccuracy existing in home modification. He thought that it is safe to use layers of varying percentages. Personally, he prefers to use a 3 per cent. milk rather than a higher grade.

DR. ROWLAND G. FREEMAN said that in his opinion the use of top milks was a very indefinite method, because it depends upon the amount of fat in the milk and upon the length of time that the bottle has stood before the milk was used. In New York City, where milk laboratories exist, people who can afford to pay for good milk should have it properly prepared. For those who cannot afford this, percentage creams should be used. These, however, are fairly expensive and the demand for them is not great owing to the fact that so many physicians use the top-milk method. It would be a great aid in infant feeding if a clean percentage cream could be obtained at a reasonable price. In regard to the variations in the fat percentages of milks, he did not believe that it was due to the rising of the cream in the cooler, but to the fact that in most dairies the milks of Holsteins and Jerseys were mixed, and if the mixing was not thoroughly done, marked inaccuracies might occur.

DR. T. S. SOUTHWORTH said that he thought they must take into consideration the fact that these estimates presented by Dr.

Bartley were made from special milks and from milks bottled under special regulations. Consequently, the daily variations found might not appear in the milks in New York City, where larger quantities of milk were mixed in larger dairies. They were probably all ready to admit that moderate variations in the fat content of milk were not of special importance in the feeding of normal infants; this was especially true concerning the fats when they were lower than normal. The less normal child often tolerated fats badly, and it was an advantage if it got a lower fat than was contained in the usually estimated percentages. The system of feeding infants with milk from the top of two bottles was one which he believed had many possibilities of trouble. Especially so, when, after the early months or weeks, this feeding was continued by the mothers because the child apparently was doing well.

Dr. Southworth said he had come across high fats in the shipment of milks from the family's own farm, where they had fancy cattle. The employees desired to please the owners and managed to send in a particularly rich milk. This might possibly be due to drawing off into the bottles the last part from the cooler, in which the fat had risen to the top. High fat percentage in the milk was often a cause of eczema, and he cited illustrative cases.

It had been stated that there was difficulty in getting accurate percentages in top milks because of the shaking of the bottles by the milkman. This, he thought, had been settled by experiments made, which proved that when the bottles were filled and capped, and the cream had risen, ordinary transportation altered very little the percentages in the top milks.

DR. MOAK, of Brooklyn, said that he was responsible for the figures presented by Dr. Bartley. Just what the variation in mother's milk from day to day over a period of ten days would be he did not know; but for cow's milk it varied greatly. It varied over 2 per cent. in the butter fat. In some herds it varied as much as 3 per cent. These variations occurred in the smaller as well as in the larger dairies.

DR. E. H. BARTLEY closed the discussion. He said that he did not intend to give the impression that a high fat meant a high proteid; merely that Dr. Harrington found that in the analyses of mother's milk quoted a high fat meant a high proteid.

THE CHICAGO PEDIATRIC SOCIETY.

Stated Meeting, April 16, 1907.

J. W. VANDERSLICE, M.D., PRESIDENT.

DR. A. W. MYERS presented a case of

VOMITING, WITH ACETONURIA AND FATTY METAMORPHOSIS OF THE
LIVER.

(For article see page 914.)

DR. S. J. WALKER regretted that there had not been a more complete postmortem, for that would have excluded any possible trouble with the central nervous system. This was important because the child had a unilateral convulsion, and, subsequently, movements described as convulsive in character, which undoubtedly were due to irritation of the cortex, or intoxication, causing irritation of the cortex.

The history is not very suggestive of any central lesion, such as a tumor of the brain, because in that case there would not have been an interval of apparent recovery between the first and second attacks.

The excessive use of fat in milk or cream mixtures is very well understood to-day in the profession, and a good many physicians, chief among them Dr. Holt, have emphasized the conditions following the prolonged use of excessive fat feeding, in which children, seemingly doing well for a number of months, break down with intestinal disturbances and convulsions and demand a period of low diet over rather a long time to straighten them out. While this danger is well understood, it still ought to be emphasized at every opportunity because even now the tendency among general practitioners is to give too high a percentage of fat and too much food to infants and young children, and this is frequently followed by dire results. This might easily be the cause in Dr. Myers's case, although the history does not show that the child had over a continuous period of time an excessive diet of fat.

DR. F. X. WALLS said that it is only of late that pediatricians have begun to consider acid intoxication, as met with in children, a condition that may be, as in this case, so serious as to kill a child, but very often simply making a child slightly ill for a time.

This acid intoxication, Dr. Walls regards as not due to starvation, but to the taking of foods that are unsuitable either in quality or quantity. Very likely Dr. Myers's case was a case of this kind, although children are found in institutions who are fed fairly well so far as regularity of feeding is concerned, yet do not seem to do well. They doubtless sometimes are taken sick in this way, sometimes die very suddenly with convulsions, and sometimes with no apparent cause, and we are in the habit of calling them cases of lymphatic diathesis. Whether lymphatic diathesis simply represents a condition of general intoxication is a question. Some have thought that it did represent that. A comparison of experience along this line will be of value.

DR. MYERS, in closing the discussion of his paper, expressed regret that a complete autopsy was not possible. The possibility of a cerebral neoplasm suggested itself, but it was out of the question to make an examination of the head. It was absolutely impossible to do anything more than was done.

DR. GEORGE J. DENNIS presented a paper on

DISEASES OF THE NOSE, THROAT AND EAR IN INFANCY AND
CHILDHOOD.

Dealing first with the diseases of the nose, Dr. Dennis emphasized especially the frequent occurrence of nasal obstruction and laid stress on two diagnostic points—absence of development of the muscles and cartilages of the alæ nasi with consequent contraction of the orifice of the anterior nares, and the almost constant discharge of sero-mucous or muco-purulent material from the nostrils. The enlargement of the bridge of the nose mentioned by several writers Dr. Dennis regards as secondary to this narrowing of the anterior nares, and believes that after removal of the obstruction a development takes place which restores the nose to its normal proportion.

The work of A. Logan Turner, on "Congenital Stridor," presented at the annual meeting of the British Medical Association in 1906, was mentioned at length.

After speaking of the anatomical peculiarities of the ear in the infant, he cited statistics to show how seldom pain is a symptom of ear trouble, and urged a careful study of the ear in all cases of fever of doubtful origin, as well as in those diseases in which the ear may play an active rôle.

DR. S. J. WALKER said the phase of the paper which most interested him, and which has interested him for a number of years, was the ear complications that are so frequent in children. He always carries a set of ear specula and mirrors for an examination of the ear, for there is no more obscure condition in children's diseases than the ear complications. He goes so far as to determine when an ear is normal and to recognize an abnormal condition. In many cases, even when no abnormality is detected, the expert is called because the conditions which may develop from the ear complications in children are so manifold and so protean in their manifestations that no set of symptoms can be relied upon as indicative of ear trouble.

In many cases—52 per cent. in the cases reported by one author—there is no pain. These figures certainly do signify the importance of the subject, and pediatricians all ought to feel that they are not through with a case until they are pretty sure what the condition of the ear is.

DR. WALLS said that all probably have had cases which for some time were very severe ones, and extremely obscure, until paracentesis or some operation has been performed and things have promptly cleared up.

He has seen cases, however, where the operation was performed, perhaps repeatedly, without benefit, and in a very sick child it might not be well to undertake it except where it is strongly indicated. Many of the cases are obscure and would not always be relieved by a recourse to that procedure.

Another feature in connection with such cases occurred to him. There is sometimes an obstruction of the posterior nasal passages from abscess—one, in particular, in his experience was especially interesting. A young child had an irregular temperature, and examination revealed an abscess which was ruptured by the exploring finger. Three such cases have come to his notice this winter—postpharyngeal abscesses that for some time were puzzling, but rigid examination revealed their nature.

THE PHILADELPHIA PEDIATRIC SOCIETY.

Stated Meeting, Tuesday, May 14, 1907.

DAVID L. EDSALL, M.D., PRESIDENT.

DR. ELEANOR C. JONES showed an infant with several congenital deformities.

DR. JAMES K. YOUNG said that the deformities of the lower extremities are probably due to a sessile tumor. The paralysis is caused by the cord being caught in the tumor. These cases can now be operated upon with safety, although most surgeons prefer to wait until later in life.

DR. J. TORRANCE RUGH called attention to the fact that malformations of the lower extremities are sometimes due to a concealed spina bifida. He recited the case of a child of two years who had not learned to walk. Upon examination a small opening was found at the last lumbar vertebra, with some swelling. It proved to be a concealed spina bifida with involvement of the cord.

DR. C. F. JUDSON and DR. R. O. CLOCK presented a patient with pericarditis.

MULTIPLE ABSCESES AND SUPERFICIAL GANGRENE OF THE TOES TREATED BY BACTERIAL INOCULATIONS.

DR. NATHANIEL GILDERSLEEVE and DR. HOWARD C. CARPENTER presented a patient with multiple abscesses and superficial gangrene of the toes, treated by bacterial inoculations. The patient, a boy nine years old, had had numerous abscesses on various parts of the body for two months, and for three weeks superficial gangrene of the toes of the right foot. His opsonic index was estimated on several occasions. He received two bacterial inoculations, the vaccine being made from pure cultures of the micrococcus aureus isolated from the patient's abscesses. He made a rapid recovery. (The complete report of this case was published in ARCHIVES OF PEDIATRICS for September, 1907, page 689.)

DR. J. P. CROZER GRIFFITH reported a case of thymus death, with exhibition of the specimens.

DR. EDSALL said that a distinction should be made between the two types of cases—the toxic ones and those due to pressure. In the report of a recent case the statement was made that all cases are due to pressure and that operation should be performed. This would be very dangerous in the toxic cases.

DR. GRIFFITH said that undoubtedly there are two classes of cases. In the cases due to pressure the symptoms come on slowly, while in the toxic cases there is usually sudden death. He thought that many cases diagnosed laryngospasm are really thymus disease.

DR. J. H. MCKEE showed two brothers with chronic parenchymatous nephritis, upon one of whom Edebohl's operation was performed in 1904.

RETROPHARYNGEAL ABSCESS.

DR. HERBERT B. CARPENTER reported 2 cases, published in full on page 932.

DR. ROY BLOSSER reported a case of lymphatic leukemia in a child seven years old.

ESTIVO-AUTUMNAL FEVER.

DR. R. O. CLOCK (by invitation) reported a case, which is to be found in full on page 918.

The Prophylaxis of Ophthalmia in the Newborn.—

Seefelder (*Münchener medizinische Wochenschrift*, March 5, 1907) speaks highly of the value of silver acetate as a substitute for silver nitrate as a prophylactic against ophthalmia in infants. The efficiency of this agent is as great as that of the nitrate, while it seems to have no disadvantages. In a series of 500 infants the author applied the acetate to one eye and the nitrate to the other and found that in no case were any evidences of irritation caused by the acetate. There was also no demonstrable damage to the corneal epithelium and the conjunctiva did not offer any indications of undue stimulation. He therefore considers that silver acetate is not inferior to the nitrate in its action, while it possesses the advantage that its solutions do not become more concentrated through evaporation, whereas, with silver nitrate, a change of this nature may lead to serious consequences.—*Medical Record*.

Current Literature.

ABSTRACTS IN THIS NUMBER BY

DR. LOUIS C. AGER.

DR. M. NICOLL, JR.

DR. J. HOWLAND.

DR. G. R. PISEK.

DR. S. W. THURBER.

MEDICINE.

Shukowsky, N. P.: Melæna Neonatorum, Hemorrhage in the Newborn from the Stomach and Intestines. (*Archiv. für Kinderhk.*, Vol. XLV., 5-6, Heft, p. 321.)

A very full review and criticism of all the theories in regard to this obscure disease and all the work that has been done on it are given. Shukowsky also gives a description of the symptomatology in general, and the symptoms in particular, in the 29 cases that have come under his observation in the last ten years. He details the methods of treatment that have been advised, a very considerable list, drugs, gelatin internally, by rectum and subcutaneously; and lays particular stress upon the washing of the stomach and colon with cold water (10° R.), which in 2 cases was used by him with the best possible effect.

J. HOWLAND.

Méry, H., and Armand-Delille, P.: Two Cases of Pharyngeal Ulceration of Hereditary Syphilitic Origin. (*Annales de Médecine et Chirurgie Infantiles*, February 1, 1907, p. 80.)

The first case, a child of fourteen years, at the time of admission to the hospital had had for six weeks pain on deglutition, cough and greenish purulent sputum. Examination showed an ulcer on the left posterior wall of the pharynx. It was oval, $2\frac{1}{2}$ by $1\frac{1}{2}$ cm.; borders not clearly defined; swollen and elevated. It was covered by a gray-green membrane partially dislodged by a stream of water. There was no marked glandular enlargement and no lesions of other organs except a few râles and a slight diminution of the respiratory sounds in the right sub-clavicular fossa. There were no stigmata of syphilis, no signs of tuberculosis. There was a slight evening rise of temperature. No tubercle bacilli were found in the sputum. Tuberculin test— $\frac{1}{10}$ mg.—was negative. Under mercurial inunctions there was a rapid improvement.

The second case was a girl of eleven years. There was a previous history of glandular suppuration. The liver and spleen were greatly enlarged, the tibiæ were thickened and bent, and

there was an interstitial keratitis. The pharyngeal ulcer was much larger than in the previous case, its appearance similar.

Under specific treatment there was marked improvement for a time, but not a complete cure. Later there developed what appeared to be tuberculosis of the knees and other indications of tuberculous infection. The authors believed this to be a case of mixed infection.

Dr. Marfan, in discussing these reports, said that the second case certainly suggested a mixed infection, but the failure of treatment in such severe cases of syphilis did not prove the presence of a tuberculous infection.

LOUIS C. AGER.

Lemaire, Jules: Six "Interior" Cases of Typhoid Fever Observed in One Ward of the Hospital for Sick Infants in Six Months. (*Annales de Médecine et Chirurgie Infantiles*, February 1, 1907, p. 88.)

By "interior" cases the writer means cases developing at such a length of time after the admission of a patient to the hospital for some other disease as to prove that the typhoid infection took place in the ward. Six cases in six months seems an extraordinary record, and Lemaire took pains to study carefully the possible means of infection. He came to the conclusion that the food and water supply was not to blame, but that infection was carried from one patient to another by nurses or physicians in some cases, and in others by the intermingling of convalescent patients. His description of nursing methods suggests conditions much behind those found in the hospitals of this country.

LOUIS C. AGER.

SURGERY.

Dench, Edward B.: Three Cases of Labyrinthine Suppuration Complicating Purulent Otitis Media. (*Annals of Otology, Rhinology and Laryngology*, March, 1907, p. 1.)

In the 2 cases of children reported, the condition was found at the time of operation for chronic suppurative otitis and in the younger child, an infant of a few months, one would not expect to make a diagnosis from increasing vertigo and headaches. The labyrinth may be invaded through two avenues, *i.e.*, through the bony wall of the horizontal semi-circular canal and directly through the oval window; in either case it is an extension from middle-ear suppuration.

S. W. THURBER.

HYGIENE AND THERAPEUTICS.

Kramer, Alfons: The Treatment of Scarlet Fever, Especially of the Septic Type. (*St. Petersburg. medicin. Woch.*, February 23, 1907, p. 51.)

Successful vaccination against scarlet fever has been recorded by Gabritschewsky, N. Lagow and others, and serotherapy tried with various and somewhat different results by many.

The writer gives a very complete clinical history of a five-year-old patient, ill with very malignant septic scarlet fever, in which as a last resort formalin (2 drops in a continuous irrigation) was used, resulting in the complete recovery of an apparently hopeless case.

The routine treatment of the disease as practiced by the writer with success is, in brief, as follows:—Plenty of fresh air. From the first day a pastille of "Formamint" (a combination of formalin and milk sugar) is slowly dissolved on the tongue and given every hour until the third or fourth day, and then every second or third hour until the temperature and the throat are normal. Iodol-sugar insufflations and hot compresses about the neck are used, and with the appearance of sepsis a continuous irrigation with formalin (1 to 3 drops according to age). Finally a full diet is given, principally of milk and rice gruel.

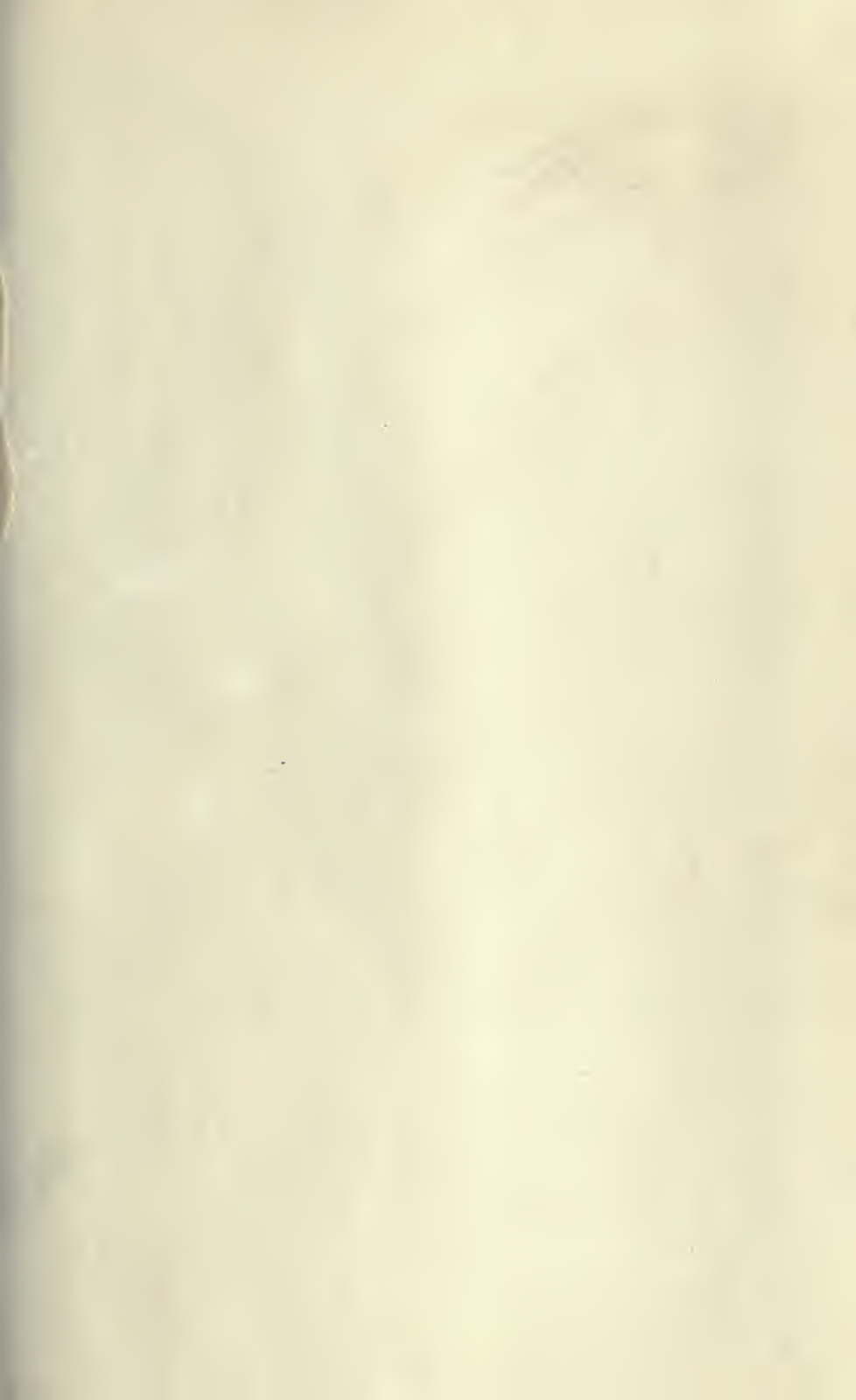
M. NICOLL, JR.

Neustaedter, M.: Some Potent Etiological Factors in Backward Children. (*Medical Record*, February 9, 1907.)

The author believes, as a result of his personal examination of children in the schools, that too much stress has been laid upon such physical defects as enlarged tonsils, adenoids and refractive errors as a causative factor in backward children; and argues that the condition is due to addiction to alcoholic stimulants, strong decoctions of tea or coffee, or to the smoking of cigarettes, or to a combination of two or all of the poisons enumerated. These habits, in his opinion, far outweigh in importance all the physical defects.

He concludes that the use of the above mentioned stimulants is an immediate exciting cause of backwardness in children.

G. R. PISEK.



RJ Archives of pediatrics
 1
 A8
 v.24

6

1907

~~Biological~~
~~& Medical~~
 Serials

PLEASE DO NOT REMOVE
 CARDS OR SLIPS FROM THIS POCKET

UNIVERSITY OF TORONTO LIBRARY

